

**RUN OVER
IT WITH
HEAVY
EQUIPMENT**

Accidents do happen and this tough, resilient cable is engineered to stand the rugged service of strip mining or any other outside construction work.



**HANG IT
OVER
CLIFFS**

The high-strength steel strands which serve as ground wires also furnish the extra strength needed for supporting the weight of the cable when it is hanging over cliffs or suspended over streams and road crossings.



must take punishment like this...

AMERCLAD GPS

IS THE CABLE YOU NEED

How PS Shielding improves worker safety

PS Shielding with conducting rubber tape is a development originated by American Steel & Wire Company engineers. It has been so successful in improving the safety of electrical cables that many other cable makers have been licensed to use this type of construction.

Type GPS Shovel Cables are made up of three flexible conductors separately insulated and separately covered with *conducting* fabric tape. When the three conductors are cabled together, three bare ground wires are laid up, one in each interstice of the insulated conductors. The assembly is completed with rubber fillers, seine cord and a heavy Neoprene jacket.

Short circuit tests were made by driving spikes and metal objects through the conducting tape into the conductor without touching the ground wire. These faults invariably tripped the overload breaker showing that PS Shielding is truly an effective safety measure.

The conclusion is that you can use these cheaper, lighter, and smaller GPS Shielded Cables without sacrifice of the safety features of the full metallic shielded Type SH Amerclad Shovel Cables.



AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

U.S.S. AMERCLAD CABLE

Save on maintenance costs

Simplify lubricant storage
and handling

Eliminate application errors
at the face

with

Gulf Mining Machine Lubricant B

This outstanding lubricant for cutting and loading machines offers effective help in your efforts to increase tonnage and reduce costs. Here's how:

Gulf Mining Machine Lubricant B provides better lubrication—wear is reduced.

Lubricant storage and handling is simplified because Gulf Mining Machine Lubricant B does the job of two or three other lubricants—provides effective lubrication for both plain and anti-friction bearings and for gears in drives and transmissions.

Application errors are avoided at the face because in most cases you need only Gulf Mining



Machine Lubricant B and a hydraulic oil—Gulf Journal Oil.

Call in a Gulf Lubrication Engineer today and ask him to demonstrate the time-saving, cost-cutting advantages of this quality lubricant. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation • Gulf Refining Company

Division Sales Offices:

Boston • New York • Philadelphia • Pittsburgh • Atlanta
New Orleans • Houston • Louisville • Toledo



Solids Pump Features Demonstrated

... on Your Desktop!



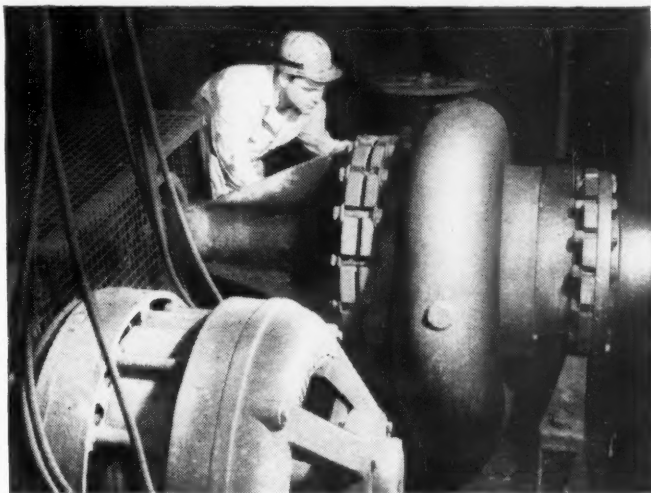
1. Easy to see . . . with this model on your desk . . . how the CW solids pump can save you big money in coal washing. It's built with *only five* working parts—all standardized and easily accessible. That means much lower parts inventory . . . time saved in disassembly!

2. Take it apart yourself—see how internal parts can be removed *without disturbing piping*. Notice the oversize shaft . . . casing and working parts made of Allisite, a special alloy for high abrasion resistance. Yes, this pump is built to last longer than you'd believe possible!

HERE ARE MAIN FEATURES OPERATORS WANT IN COAL WASHING PUMPS . . .

- High Abrasive resistance of wearing parts.
- Rotating elements accessible without disturbing the piping.
- Simple design, with easy parts replacement.
- Standardization of parts — to reduce inventory.
- Low hp requirement.
- Capacity changeable by speed adjustment . . . without having to change impeller.
- Ability of pump to deliver near rated capacity until parts are completely worn out.
- Variable discharge nozzle arrangement.
- Heavy-duty construction with oversize shaft.

— GET ALL THESE FEATURES IN ALLIS-CHALMERS' CW SOLIDS PUMP



3. In fact, survey results (see above) show that this solids pump offers most of the features wanted by experienced users! Developed by Allis-Chalmers especially for coal washing, its thoroughly sound design makes possible handling up to 40% solids in suspension efficiently.

4. Low hp requirement on the job is further proof of this pump's high efficiency design. It moves *more* solids at *less cost*! To change capacity, only the speed need be adjusted. Variable discharge nozzle arrangement makes pump suitable for cramped quarters.

GET MORE FACTS! With no obligation on your part, the A-C representative in your locality will arrange a desktop demonstration of this model solids pump. Clip the coupon NOW and send it direct to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2443

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products



WRITE FOR FREE DEMONSTRATION

Allis-Chalmers Mfg. Co., Milwaukee 1, Wisconsin

- ☐ Yes, I would like to see this model solids pump in my office.
- ☐ Please send me Solids-Handling Pump Bulletin 08B6381B.

NAME.....

ADDRESS.....

FIRM.....

Snow Hill builds for future coal competition on a profit-making past



The profit-minded executives at Snow Hill took a courageous step eleven years ago. They decided to build a coal preparation plant. It was one of the world's fine coal preparation plants at the time. Snow Hill had always produced a good product . . . always served a discriminating clientele, and they were determined to maintain that position.

The latest new plant at Snow Hill, illustrated here, is a worthy addition to facilities that actually make markets for Snow Hill products. It is designed to take the run-of-mine coal from two highly mechanized underground mines and upgrade it to premium fuel.

Clean, heat-rich coal reaches old customers in greater abundance. It also travels to new markets where coal buyers are realizing more and more that specification fuel is the very best buy for their coal dollar.

How to create markets like this for coal is a subject our technical staff is well qualified to discuss with you.

Snow Hill Coal Corporation
Preparation Plant, Terre Haute,
Ind. . . . dedicated to making
coal clean, premium quality, and
profitable. Walter Bledsoe & Com-
pany, exclusive sales agents.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburgh Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburg, Kan. • Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

Customer satisfaction is the most important product produced at Snow Hill

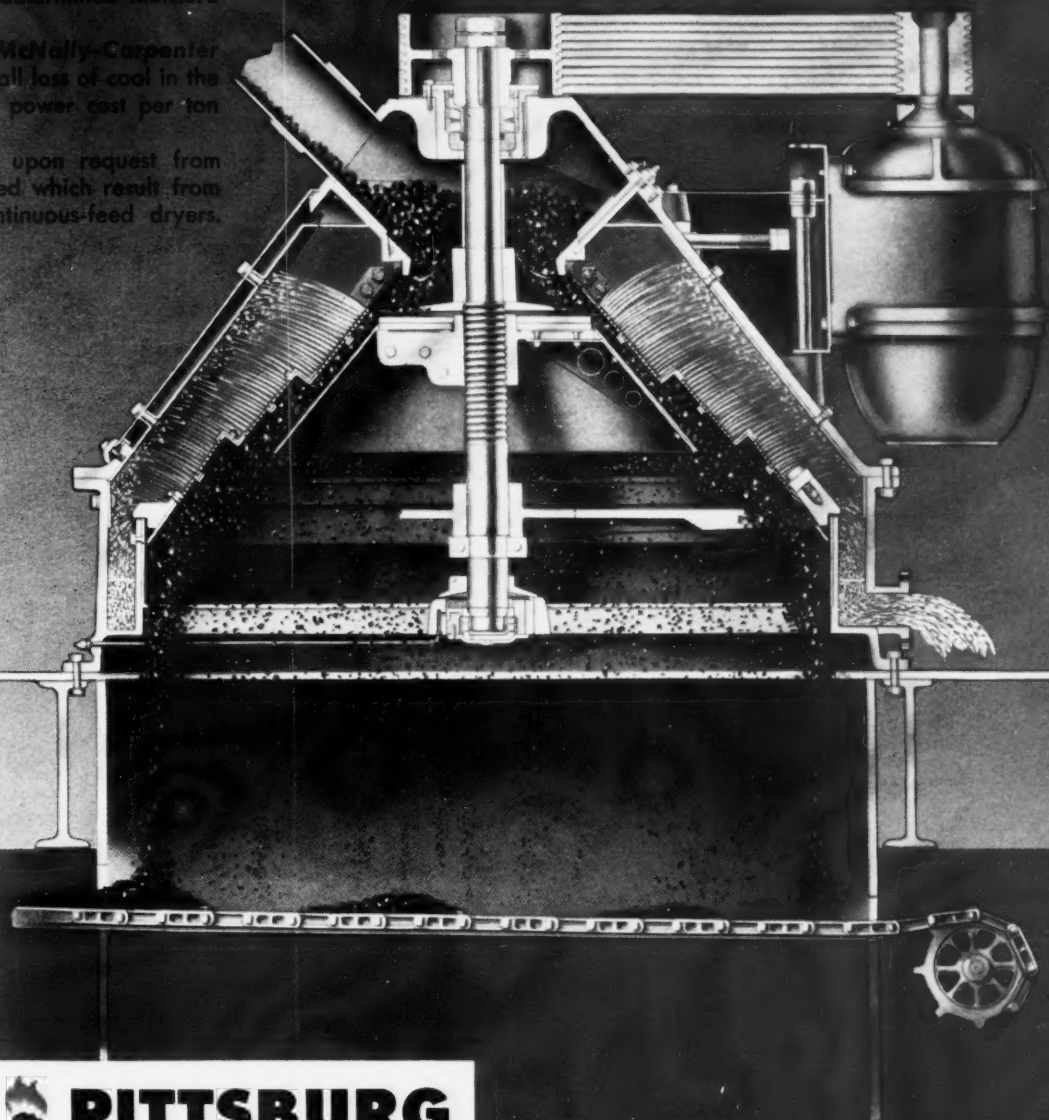
One of the chief contributors to Snow Hill production efficiency and continuing customer satisfaction is its battery of mechanical coal dryers.

At Snow Hill, washed coal passes over the stepped-truncated drying cones of not one, but three McNally-Carpenter centrifugal dryers. As coal flows through the cone, drying action increases directly in ratio with cone circumference and peripheral speed. Just before the material discharges into the hopper, the final centrifugal pressure is exerted, and the coal particles emerge dried to their predetermined moisture percentage.

Production men welcome the McNally-Carpenter because of high water removal, small loss of coal in the effluent; large capacity, and lower power cost per ton of dried product.

Further details will be sent, upon request from you, about the economies and speed which result from the use of McNally-Carpenter continuous-feed dryers.

The Snow Hill Coal Preparation Plant, at Terre Haute, houses a gallery of McNally-Carpenter Dryers to assure continuous drying action and uniform moisture content of coal.



M'NALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally-Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburg, Kan. • Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

PREPARATION vs. PROFITS

answered . . .

the **AMERICAN** way



Conventional
uncontrolled
shattering
action

= { **UNCONTROLLED SIZING**
EXCESS FINES
COARSE SIZING



AMERICAN
controlled
splitting
impact

= { **MORE MARKETABLE**
and PROFITABLE
CONTROLLED SIZING

Your profit is in the preparation — and American Crushers are designed especially to help you get higher tonnage — greater profits, with lower preparation costs. By reducing coal through cleavage instead of blunt shattering force, Americans give a controlled ratio of fines — no oversize — and permit a high tonnage output of uniform marketable sizes — regardless of the range of reduction.

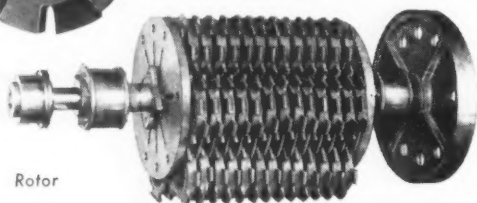
Doubly adjustable for flexibility of sizing to meet fluctuating market conditions, Americans give added savings by operating at low, power-saving speeds. Available in a wide choice of types and sizes to exactly fit your operation . . . capacities from 50 to 500 TPH.

Shredder Ring

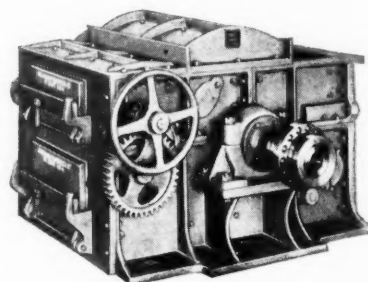


Shown here are American's exclusive manganese steel shredder ring and rotor assembly — for rapid reduction action at slow, power-saving speeds. Each ring has twenty cutting edges — and revolves on individual shaft, free to deflect from tramp iron without damage.

Rotor



American AC Type Rolling Ring Crusher, with housing of massive, high-test cast construction, rib-reinforced to withstand enormous crushing strains. Dust-tight, machined joints. All crushing parts of manganese steel.



Send for AC Bulletin on coal crushing data and crusher specifications.

American

PULVERIZER COMPANY

*Originators and Manufacturers of
Ring Crushers and Pulverizers*

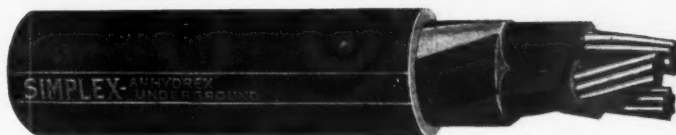
1119 Macklind Avenue
St. Louis 10, Mo.

AVOID

LEAD SHEATH TROUBLES



WITH ANHYDREX CABLES



Here's an example of what can happen to lead sheaths on underground cables wherever stray currents, vibration and harmful soil acids prevail. And being underground, such damage can easily go unnoticed until important electrical systems go out of order. You must avoid this trouble at the very outset, and you can, by installing Simplex-Anhydrex Cables.

ANHYDREX Cables can be buried directly in earth or gob, or be pulled into ducts, but they have **no** lead sheaths. They're not subject to electrolysis and crystallization and their tough neoprene jackets withstand exposure to soil acids, alkalies and abrasion. Their ANHYDREX insulation assures you of trouble-free service in wet locations. Even when constantly immersed in water it remains both physically and electrically stable.

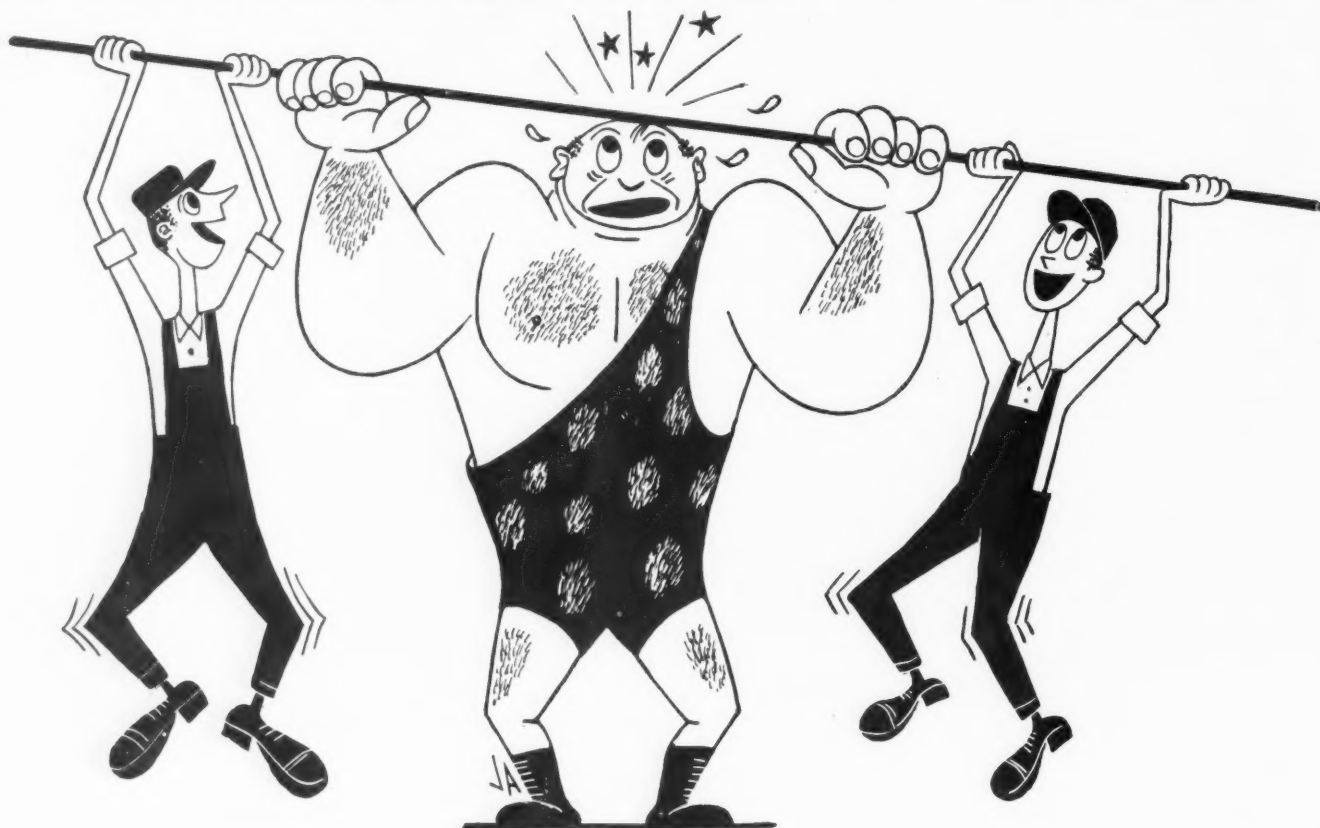
ANHYDREX Cables, too, are lighter in weight, easier to install. In fact, they'll add in many ways to the efficiency and economy of power distribution, telephone communication, track signal and relay control circuits in your mine. Our booklet 985-A gives full details; write for it today.

Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

U·S·S Carillo Steels feature GUARANTEED MINIMUM HARDENABILITY



**SYMBOL
OF SERVICE**

for Steel Users



When you order U·S·S Carillo Steels, you are sure of two things:

Reliable performance which comes from alloy steel manufactured to a *Guaranteed Minimum Hardenability*.

Prompt filling of your orders through our large and diversified stocks.

And there is another and very important advantage—an additional metallurgical service—to users of U·S·S Carillo Steels:

You are supplied with a Heat Treatment Guide which contains complete and specific information on the steel you receive with each shipment. That is, you get *specific* data on the composition, potential physical properties and recommended heat treatment temperatures to help you obtain the maximum performance from the steel furnished on your order.

Just telephone, wire or write the U·S·S Supply warehouse nearest you.

UNITED STATES STEEL SUPPLY COMPANY

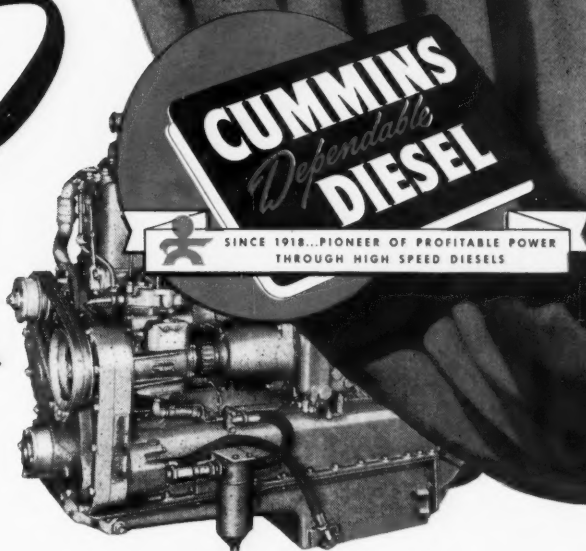
CHICAGO (90)	1319 Wabansia Ave., P.O. Box MM	BRUnswick 2000	MILWAUKEE (1)	4027 West Scott St., P.O. Box 2045	Mitchell 5-7500
BALTIMORE (3)	Bush & Wicomico Sts., P.O. Box 2036	EDmondson 4900	NEWARK (1), N. J.	Foot of Bessemer St., P.O. Box 479	Bigelow 3-5920
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			TWIN CITY	2545 University Ave., St. Paul (4), Minn.	MArket 1-4988 ENterprise 1-0017
					NEstor 7311

UNITED STATES STEEL

A N N O U N C I N G

the NEW

HR



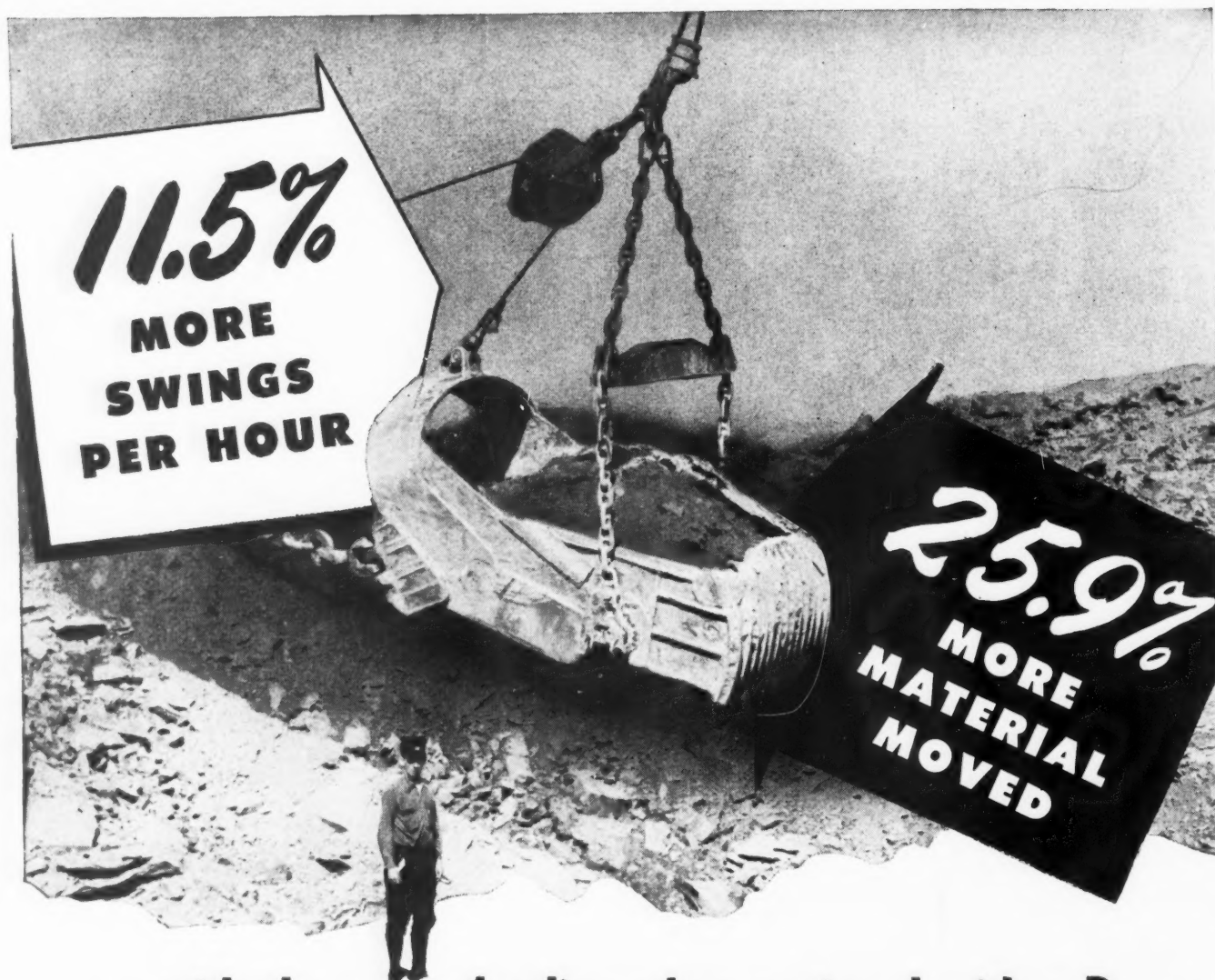
165 hp at 1800 rpm

Similar in design to the famous "Model H" . . . for 15 years the standard of comparison for high-speed diesel engines . . . the new six-cylinder Cummins

HR-600 Engine offers you even more power per engine pound.

Your Cummins Dealer or the manufacturer of your earth-moving and material-handling equipment can show you this newest Cummins Diesel. Your Cummins Dealer can also *convert* your present "Model H" engines. See him.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA



... with the same dragline when equipped with a Page **AUTOMATIC**

On an actual 16 consecutive day run with all conditions alike — the same dragline, the same operators and the same material, a 25 cu. yd. Page AUTOMATIC Dragline Bucket outperformed a competitive bucket of the same rated size by a wide margin. The table gives all the facts found by a well-known coal company which made the test to determine the best bucket for their own stripping operations.

Assuming that both buckets carried equal loads, the Page AUTOMATIC made 11.5% more swings per hour. Considering both the increased number of swings and larger loads, the Page AUTOMATIC moved 25.9% more material than the competing bucket.

The extra bucket loads were obtained by the AUTOMATIC because of its quick loading features. Generally, little more than two lengths of the bucket are required to pick up a full load.

Rated capacity cu. yds.	No. of 24-hour days in use	No. of bucket loads in period worked	User's Engr's estimate of cu. yds. per bucket load	Total cu. yds. excavated in period worked	Cu. yds. excavated in 24-hour day	Average number of bucket loads per hour
25 Cu. Yd. Competing Bucket	15 consecutive days	19,685*	20.2	397,637	26,509	54.68
25 Cu. Yd. Page Automatic	16 consecutive days	23,424*	22.8	534,067	33,373	61.0

*Recorded by Esterline-Angus

The increased yardage moved with the AUTOMATIC was due to its ability to obtain full loads on every trip while the competing bucket did not load the back end once out of ten times.

No effort was made during the test to determine the amount of dragline pull necessary to operate either bucket. However, other installations have proved that a Page AUTOMATIC requires up to 25% less dragline pull than the usual old style bucket.

Whether you need a small bucket or a big one, you can always move more yardage at less cost with a Page AUTOMATIC.

PAGE ENGINEERING COMPANY, Clearing Post Office, Chicago, Illinois

They Standardized

**ON POWER EQUIPMENT
THAT STANDS UP**

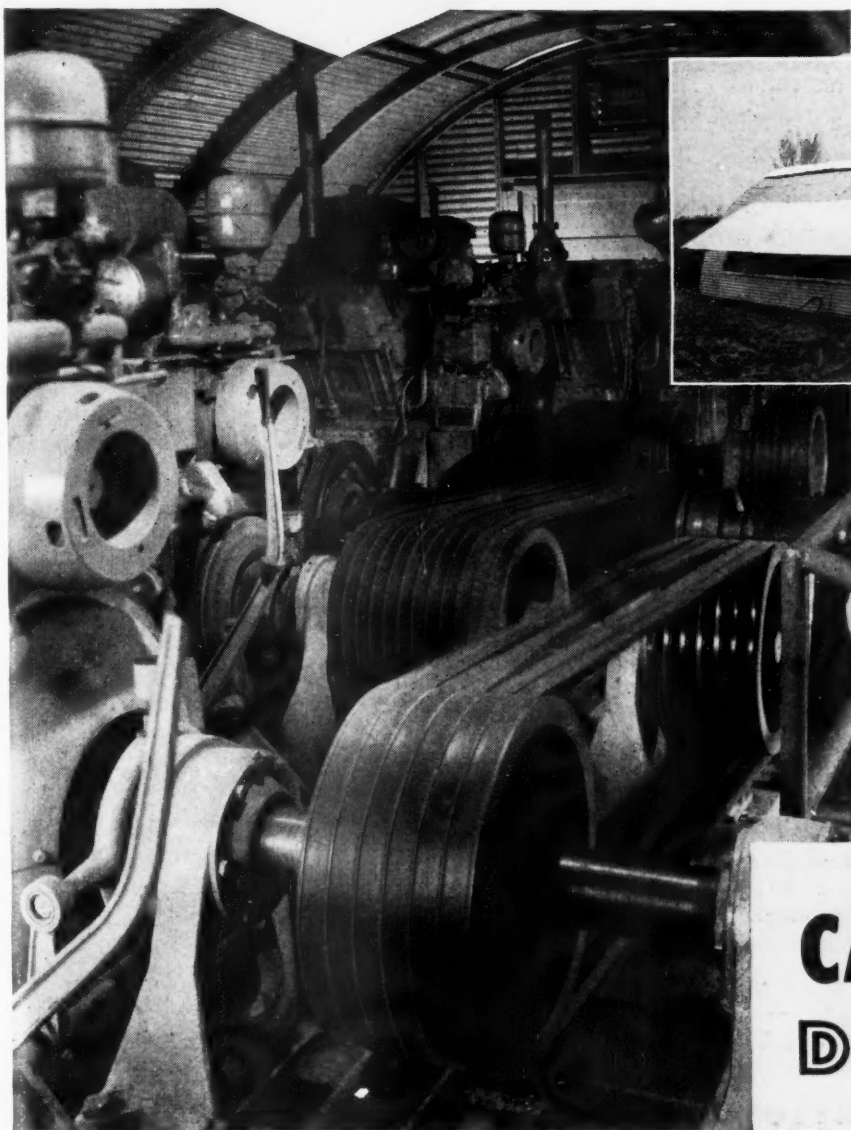
THE Chicago-Wilmington & Franklin Coal Company recently installed four powerful "Caterpillar" Diesel D17000 Engines on a new mine project near Waltonville, Ill. V-belted to a common shaft, they drive generators that supply all the electricity needed for lighting, sinking shafts, operating hoists, driving fans and compressors. Later they'll add Joy loaders and other mine-operating machinery to their tasks.

The Company also owns other "Caterpillar" units. These include a D13000 Engine driving a Gardner-Denver compressor, a D318 Engine powering a Lorain crane, and a D7 Tractor for earthmoving and heavy hauling.

"Our 'Caterpillar' equipment stands up fine," says Supt. Kenneth M. Rodenbush. "We get good dealer service. We are completely satisfied with it."

Standardizing on "Caterpillar" equipment brings many advantages. You get power equipment with fine engineering, highest-quality materials, careful manufacture, low operating and maintenance costs, long life—and dependable performance day in and day out. You give yourself convenient access to replacement parts, inspection, repair and other services through a single dealer organization that is widely regarded as the most complete and efficient of its kind in the world.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



• This new building houses the four "Caterpillar" D17000 Engines shown in main illustration.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL

**ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT**

Cooperation...

A 40 YEAR TRADITION

The Whaley "Automat" carries a reputation of long standing as an efficient, low maintenance and serviceable loader. We believe this fact is recognized generally in the coal industry.

We believe also, that the delivery of an "Automat" is only the first step into many years of satisfactory performance. Of equal importance has been the careful attention an owner receives from the factory after he puts the machine to work in his mine. This tradition of co-operation started 40 years ago when Myers-Whaley built the world's first practical loading machine. It's a practice of long standing behind every "Automat" sold . . . a practice of making the customer's problems our problems. "Automat" owners know that on any occasion or in any emergency, they can depend on prompt attention and careful handling of their requirements.

Replacement parts are manufactured in the Myers-Whaley plant to meet the highest standards of material and workmanship. In emergencies, your requirements for replacement parts takes first place in the Myers-Whaley Plant. Your problem becomes our problem and shipments are made to the customer with the greatest speed at our command. Myers-Whaley Co-operation is another good reason why you should investigate the Whaley "Automat."

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or laries, can take.

MYERS-WHALEY

KNOXVILLE



TENNESSEE

MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS

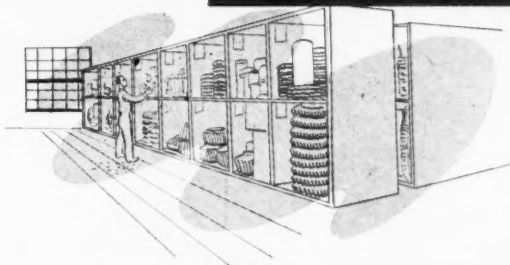
BEHIND EVERY WHALEY "AUTOMAT"

PRECISION PARTS



Built in the Myers-Whaley plant to meet the highest standards of materials and workmanship.

WELL STOCKED



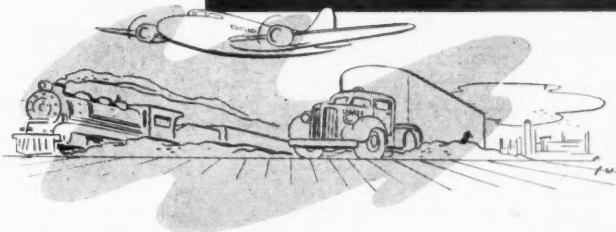
Every effort possible is made to furnish parts requirements promptly.

PROMPT ATTENTION

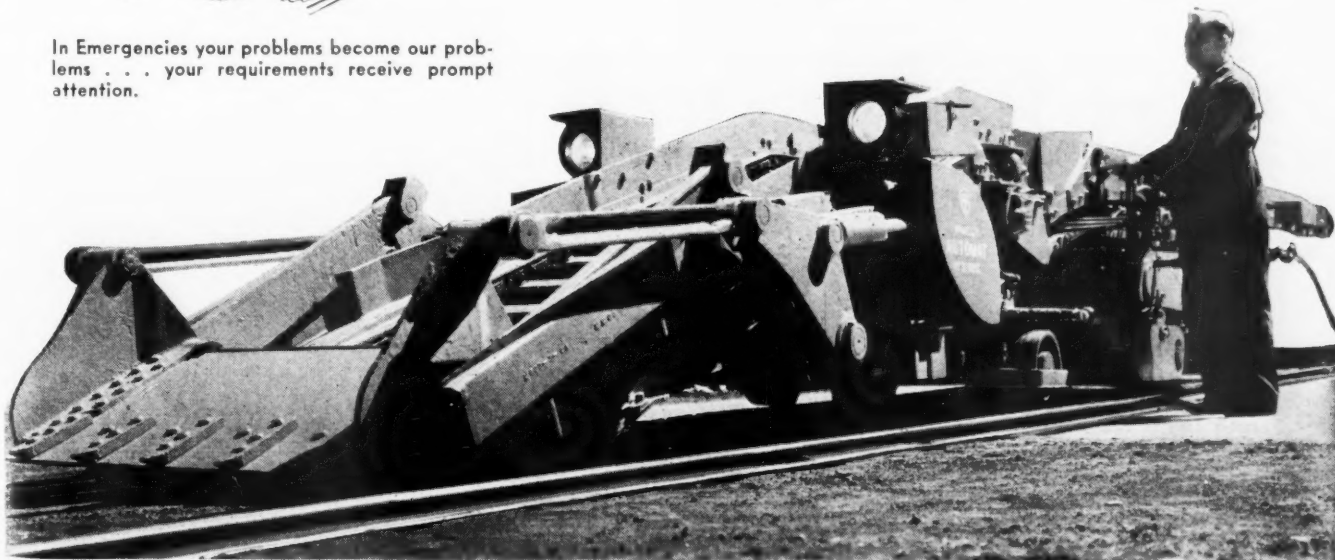


In Emergencies your problems become our problems . . . your requirements receive prompt attention.

DELIVERED ON TIME

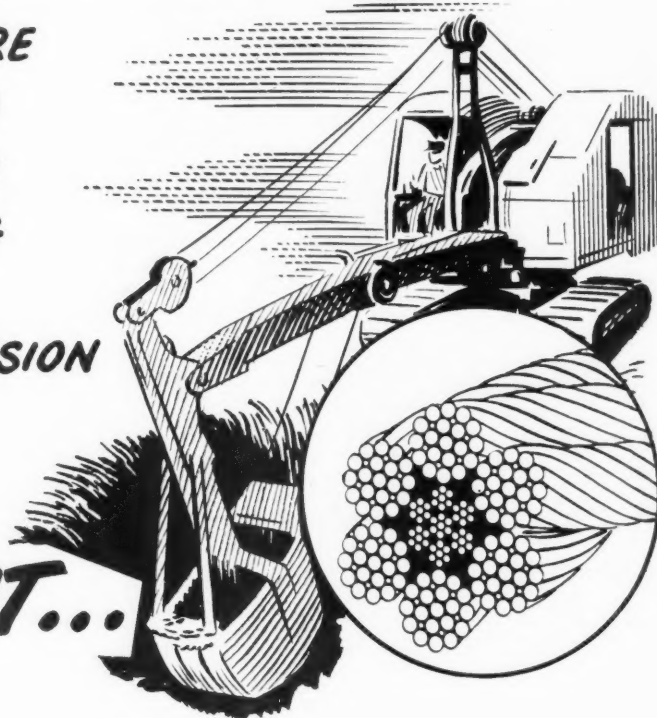


Every means at our command is used to get emergency shipments to you at the earliest moment.

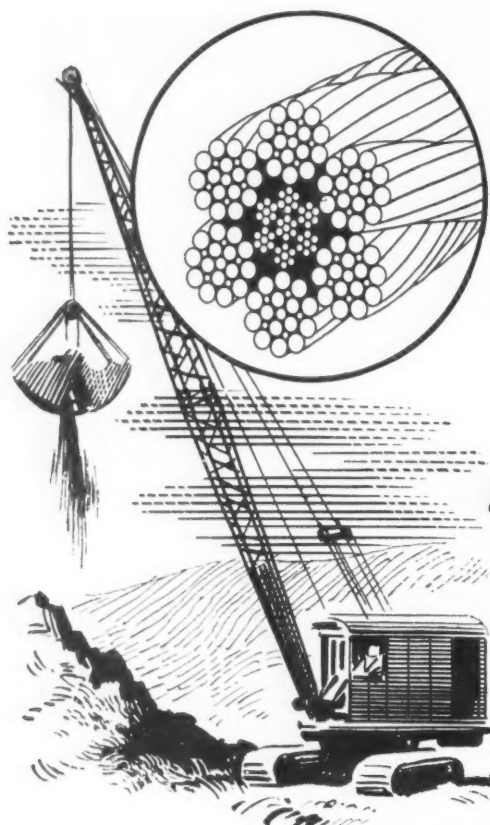


SOME ROPES FOOL YOU

U-W 6x19 LANG LAY FILLER WIRE CONSTRUCTION (WITH I.W.R.C.) IS GOOD FOR TRENCH HOES OR BACK DIGGERS BECAUSE LANG LAY CONSTRUCTION OFFERS GREATER RESISTANCE TO ABRASION AND BENDING FATIGUE



BUT...



FOR CLAM SHELL CRANES, U-W 6x19 REGULAR LAY FILLER WIRE CONSTRUCTION (WITH I.W.R.C.) IS BETTER BECAUSE IT IS MORE RESISTANT TO CRUSHING AND DISTORTION CAUSED BY HIGH RADIAL PRESSURE AND MULTIPLE SHEAVE REEVING

For longest and best service, always specify
U-W LAYRITE (Preformed) IMPROVED PLOW STEEL

UPSON-WALTON IS THE ONLY MANUFACTURER OF ALL 4...

Wire Rope, Tackle Blocks, Wire Rope Fittings, Brattice Cloth.

We invite you to let us engineer your problem jobs.

Copyright 1948—The Upson-Walton Company

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street
New York 4

3525 West Grand Ave.
Chicago 51

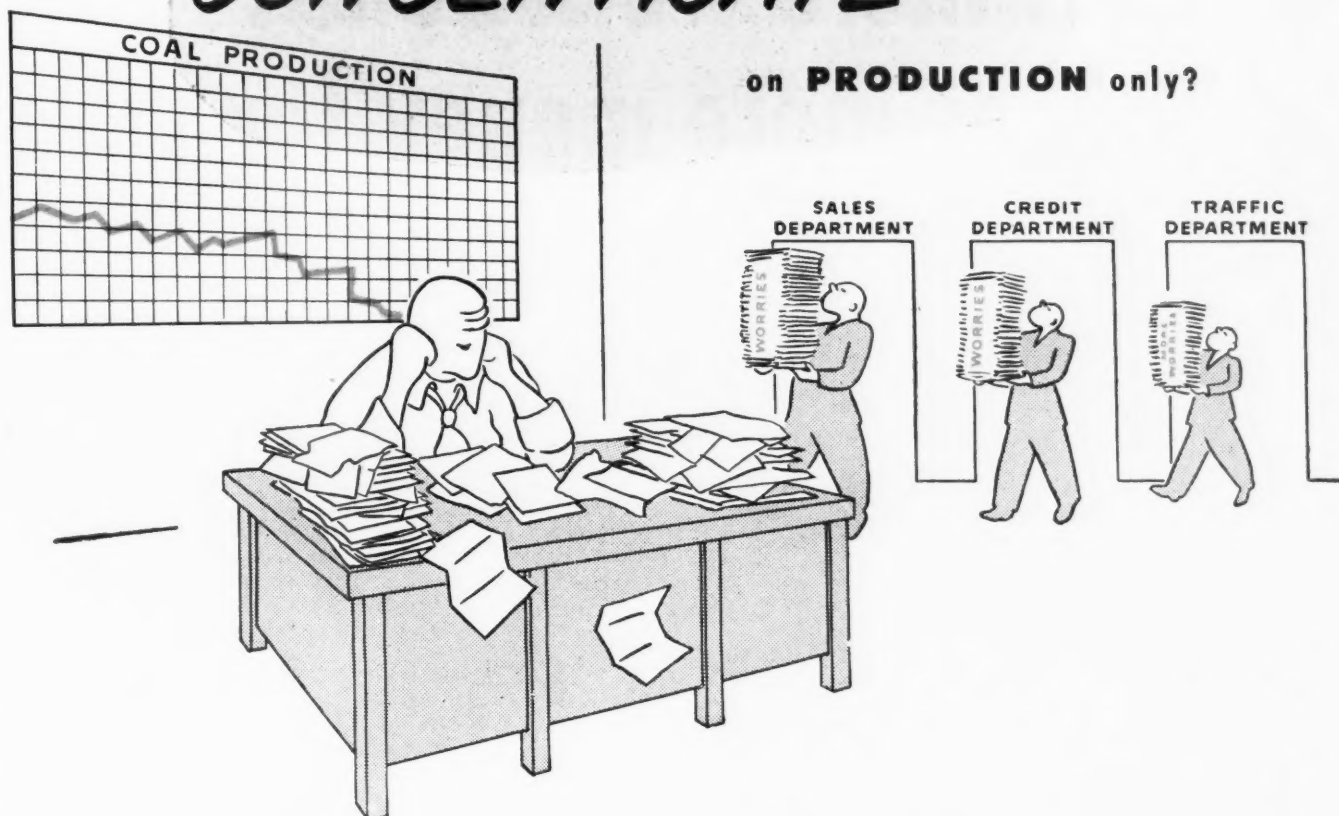
241 Oliver Building
Pittsburgh 22



Ever wish you could

CONCENTRATE

on **PRODUCTION** only?



Why Not?

We are doing the job for many other coal operators and as a result, they are increasing production and enjoying higher profits. Here is a list of services we perform while you concentrate on production:

INTENSIVE SALES COVERAGE

MARKET ANALYSES

PROPER SALES PLANNING

TRAFFIC PLANNING

INSPECTION SERVICE

ADVERTISING AND PUBLICITY

COMBUSTION ENGINEERING SERVICE

CREDIT, SALES ACCOUNTING SERVICES

Write, wire or phone for further information.

Snyder & Swanson

COAL MERCHANDISERS

Main Office: PITTSBURGH, PA.



INC.

BRANCH OFFICES

- CLEVELAND
- BALTIMORE
- NEW YORK

Shipment By:

RAIL • LAKE • TIDEWATER

Why **TOURNADOZER**

- ✓ gets more work done . . .
- ✓ makes more money for YOU!

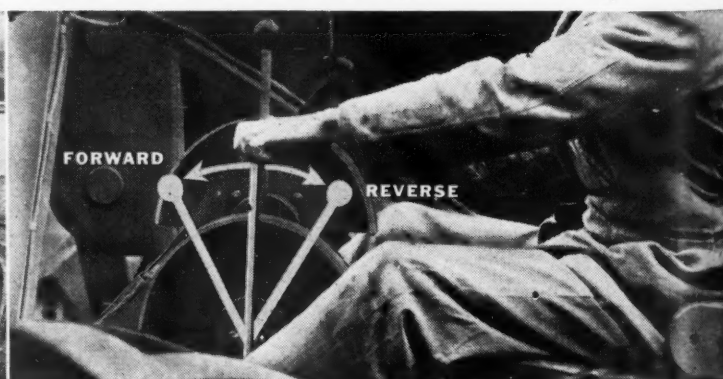


1 FASTER CYCLES — "C" Tournadozer gives you double average crawler dozing speed forward . . . reverse three times faster. You use higher gear speeds through instant speed selection. Saves 10 seconds every time you shift.

2 AROUND JOB 15 mph — Means more jobs done, less non-productive dozer time. One Tournadozer can clean up around 2 or 3 shovels, also maintain roads and service dump. A half mile is only two minutes away.



3 180 HP PUSH OR PULL — Hangs on and pulls under heavy load . . . low compression ratio diesel . . . more power with less fuel. 4-wheel drive . . . quick pick-up for fast get-away . . . climbs steep grades.



4 INSTANT GEAR SELECTION — Change gear ratio instantly, automatically, with finger-tip air-valve lever. Constant power retains momentum . . . keeps dirt rolling. Travels 100' in 3rd gear, forward or reverse, while crawler shifts gears.

*Mail
Today*

R. G. LeTOURNEAU, Inc., Peoria, Ill.: Please send information on "C" Tournadozer

☐ Specifications

☐ Price

☐ Delivery

☐ Where to See

NAME

TITLE

COMPANY

BUSINESS

ADDRESS

CITY and STATE

TYPE of WORK for TOURNADOZER

Tournadozer-Trademark C96

5

QUICK MANEUVERABILITY — Short-coupled 6' wheelbase, 4-wheel air brakes, instantaneous shift, give you a compact fast-stepping unit. Means better application of power, easier synchronization with other units.

6

BIG BOWL CAPACITY — 11'2" blade with bowl 3'7" high fills fast, drifts a big 2½ yard load. Rolls dirt easily, holds well on sides for big pay loads. Blade quickly tilted to cut in on side hill or ditch.

7

FAST BLADE ACTION — New, powerful, air-actuated PCU plus improved blade bite gives faster, better controlled blade to match high dozing speed. 44" lift . . . unlimited drop. Smooth, accurate, short-coupled cable-control.

8

FULL OPERATOR VISIBILITY — Operator sits up front ahead of engine, can see where he's going . . . what he's doing. Easier to line up for pushing . . . work over a bank . . . safer to clean up under shovel dipper.

9

EASY TO OPERATE — Compressed air takes the work out of Tournadozing. Simple controls are air-actuated . . . easy to reach . . . easy to operate. No stretching, no twisting, no fatigue slow-down.

10

TRAVELS ANYWHERE — Makes self-powered moves over macadam, pavement or black top . . . crosses curbs, rails or driveways without planking. Works in plant yards, shop or factory with no damage to surfacing.

11

LOW MAINTENANCE — Giant tires absorb shocks. No multitude of moving parts constantly grinding in dirt. Dust-proof case encloses gears, shafts and bearings, operating in oil. Big "oversize" clutches, brakes.

12

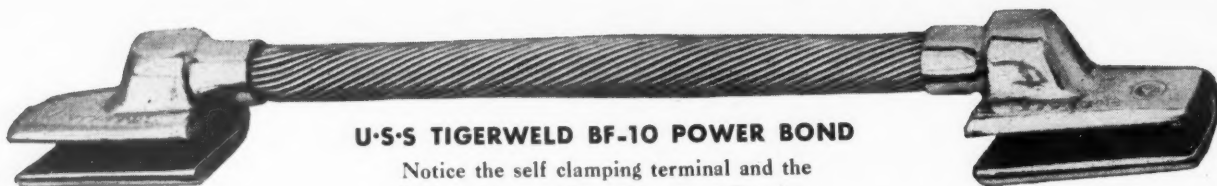
GETS MORE WORK DONE — Does 2 or 3 cycles to crawler's 1. Makes push contact faster . . . loads faster. Makes job moves much faster . . . handles more assignments . . . utilizes waiting time to do odd jobs.

LETOURNEAU
PEORIA, ILLINOIS



TOURNADOZERS

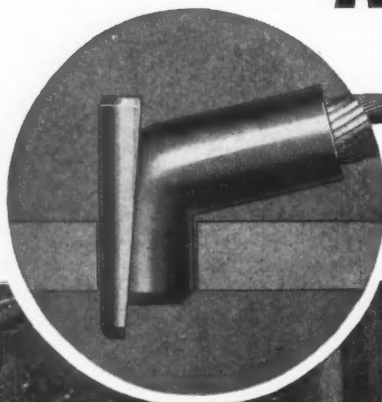
IT'S RUBBER THAT PUTS THE ACTION IN TRACTION



U-S-S TIGERWELD BF-10 POWER BOND

Notice the self clamping terminal and the heavy cable to withstand constant vibration.

THESE BONDS GO ON EASY -AND STAY PUT!



U-S-S AMERICAN WEDGE-TYPE BOND

Easy to install but won't shake loose. Designed especially for track that may be moved.



THE TIGERWELD BF-10 Power Bond is our newest welded type bond. Its self clamping feature makes it easy to install. Just hammer it on to the base of the rail and it stays in position ready to weld. The terminals are designed so that you can weld a bead in the shortest possible time—and the bond stays put—for good!

The Wedge-Type Bond is designed for quick installation on track that may have to be moved. It can be installed in a few minutes with a high speed drill and a three pound hammer. This bond holds so well in service that some mines use it for permanent installations.

Both bonds assure low resistance connections and are mechanically strong enough to withstand heavy vibration and derailments.

Many other types of U-S-S TIGERWELD Rail Bonds are available. Contact our nearest sales offices for complete information. Send for our new catalog.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · CHICAGO · NEW YORK

COLUMBIA STEEL COMPANY, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS

TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
SOUTHERN DISTRIBUTORS

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

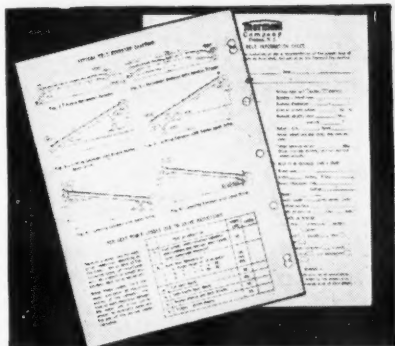


U-S-S American Rail Bonds

UNITED STATES STEEL

Thermoid

Conveyor and Elevator Belting



There are several standard types of Thermoid Conveyor and Elevator Belting with different thickness and cover characteristics to suit the materials to be handled, angle of incline, speed of belt and other wear factors. Special constructions are available to meet extreme requirements. To check your needs accurately, fill out a Thermoid Conveyor (or Elevator) Belt information sheet, available upon request. The data you furnish will enable us to recommend the most satisfactory and economical belt for your job.

For Severe Service...

Thermoid "HT" Type—Built to carry highly abrasive materials under severe conditions. Supplied with 48 oz., 42 oz. or 35 oz. hard duck, 32 oz. or 28 oz. fabrics. Skim coat between plies. Average friction 20 to 24 lbs.; average tensile strength of covers 3500 to 4000 lbs. In widths, number of plies and cover thicknesses as specified. Maximum width 60"; approximate roll length 525 ft.

For Regular Service...

Thermoid "A" Type—Is built to carry moderately abrasive materials in regular service. Furnished with 42 oz., 35 oz. hard fabric, 32 oz. or 28 oz. fabric. Skim coat between plies; average friction 16 to 19 lbs.; average tensile strength of covers 2500 to 3000 lbs. In widths, number of plies and cover thicknesses as specified. Maximum width 60"; approximate roll length 525 ft.

For Light Service.....

Thermoid "C" Type—Is made to carry non-abrasive materials under light service conditions. Furnished with 28 oz. or 32 oz. fabric. Average friction 12 to 15 lbs.; average cover tensile 800 to 1000 lbs. Number of plies and cover thicknesses are optional. Maximum width 60"; approximate roll length 525 ft.

Other Thermoid Conveyor Belts made to meet special conditions: Neoprene, for use where oil and grease are present; "Ruff Top", for packaged goods; "HH", for high temperatures; and Canners, for fruits and vegetables—Information upon request.

The Thermoid line includes: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Custom Molded Products • Industrial Brake Linings and Friction Materials.

Thermoid
Company

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Automotive and Industrial Rubber Products • Friction Material • Oil Field Products

NOW! BETTER

with 2 NEW, low cost

STOODY SELF-HARDENING 21
FOR EXTREME ABRASION RESISTANCE
RECOMMENDED FOR: Bulldozer Blades, Dippers, Elevator Bucket Lips, Crushers, Impellers, Muller Tires, Grizzlies, Etc.

STOODY 1027
FOR WITHSTANDING SEVERE IMPACT
RECOMMENDED FOR: Tractor Track Rollers, Idlers, Crawler Pads, Mechanical Loader Lips, Tie Tamping Bars, Picks, Etc.

Here's the ideal COMBINATION

to get more wear, longer life with utmost economy on all heavy equipment.

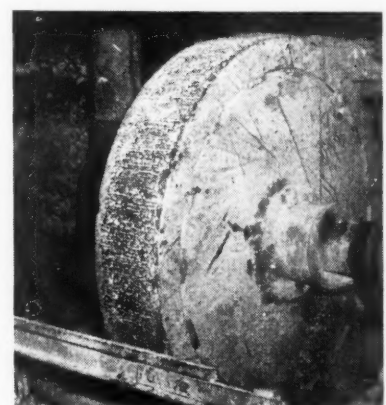
FOR YEARS, wear protection on heavy equipment has been a problem because of the many wear factors involved and diversity of application requirements. For example, an alloy with high impact strength sacrifices some wear resistance and vice versa; smooth, fluid deposits defeat position welding; high alloy content with increased wear resistance loses forging qualities. And low cost electrodes are always a major requisite.

Obviously one hard-facing alloy can't do all jobs equally well. That's why Stody now offers TWO new rods to cover your everyday hard-facing requirements on heavy equipment. No single rod can do what this low-cost combination does because you can now select the *best* alloy for specific wear problems. Each rod has been completely field-tested for over a year on a wide range of applications. Results are positive on recommended uses.

TYPICAL EXAMPLES WHERE STOODY



DREDGE PUMP CASING—A typical application of Stody Self-Hardening 21. A 1/4" single pass layer is applied manually to the new casing. May be reapplied as needed.



MULLER TIRES—Unprotected Muller tires normally lasted 2 years. After applying 75 lbs. of Stody Self-Hardening 21 this tire shows practically no wear in 5 month's operation, will probably last 3 years or more with greatly increased efficiency.

WEAR PROTECTION

Stoody Hard-Facing Alloys!

STOODY Self-Hardening 21

DESCRIPTION

A low cost, high alloy fabricated rod (alloys in tubes) composed of chromium, manganese, silicon, carbon and zirconium. Possesses highest abrasion resistance of any rod in low priced field, with good impact strength and excellent weldability. Exceptionally economical on big equipment requiring large hardmetal deposits. Primarily recommended for down-hand application.

WELDING CHARACTERISTICS

Fastest deposition rate of any low cost alloy.
AC-DC application, straight or reverse polarity, on both bare and coated rods.
Bare rods run as easily as coated.
Bonds to all types of steels, manganese and cast iron.
Will not spall even when surface checks develop.
Graphite type coating eliminates arc interference and slag. No hot slag hazards, no more slag chipping.
Multiple passes for heavy deposits.
Can be applied in any bead type.

SIZES: Available both BARE and COATED in following sizes: 1/8" Coated, 5/32" Coated, 3/16" Bare and Coated, 1/4" Bare and Coated, 3/8" Bare. Prices range from 50 cents to 85 cents per lb. depending upon rod size and quantity.

STOODY 1027

DESCRIPTION

Low cost coated rod having a steel core wire with all alloys contained in a heavy, extruded, graphite type coating. Composed of chromium, manganese, and carbon. Possesses the ultimate in impact strength with good wear resistance.

WELDING CHARACTERISTICS

Exceptional weldability.
AC-DC application.
Dense deposits.
Freedom from surface checking.
Fast deposition rate.
Deposits forgeable at red heat.
Ideal for position welding.
Multiple deposits without slag chipping.

SIZES: Available COATED only in following sizes: 1/8", 5/32", 3/16", 1/4". Prices range from 50 cents to 75 cents per lb. depending upon rod size and quantity.



Here's what enthusiastic users say about the new Stoody Self-Hardening 21...

"Stoody Self-Hardening 21 used on cement mixer paddles and tamper heads is lasting twice as long as regular Self-Hardening. Very pleased with cost of application and way rod is going on."

Signed: M. H. Forbush
Foreman
Pollard Bros.
Fresno, Calif.

"We have been using Stoody Self-Hardening 21 for the past year on the top hammers of our Disintegrator on heavy industrial grinding operations. Our experience has been very satisfactory and we have found the rod easy to apply."

Signed: S. P. Wilson
Plant Engineer
Joseph Wagner Mfg. Co.
San Francisco, Calif.

"We are now using Stoody Self-Hardening 21 as our standard crusher maintenance hard-facing alloy after comparing performance with alloys costing as much as \$5.00 per pound. It not only performs better but provides a sounder weld when repeatedly applied. Stoody Self-Hardening 21 is the finest hard-facing rod yet developed for this type of work."

Signed: Harry Gravos,
Welding & Crusher
Maintenance Specialist
Spokane, Washington

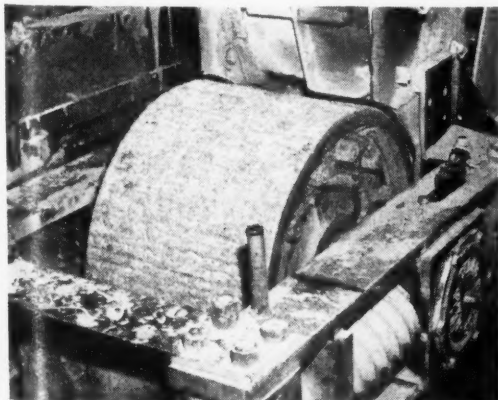
"After two months test on pressure rolls crushing 'Haydite' Stoody Self-Hardening 21 shows 50% better wearing qualities than competitive rod."

Signed: Adolph Schaad
Plant Sup't.
McNear Brick Co.
San Rafael, Calif.

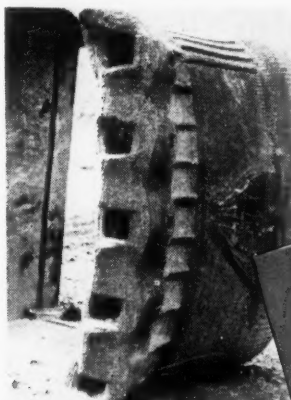
"We ran careful tests on a number of hard-facing rods and found Stoody Self-Hardening 21 to have exceptional wear resistance, high rate of deposition and we have eliminated our former trouble with spalling after repeated applications. We always have more demand for rods than money to build them and the low cost of our hard-facing is a help to our budget."

Signed: D. E. Kirchner
King County Road District #2
Seattle, Washington

HARD-FACING ALLOYS ADD LIFE, CUT COSTS

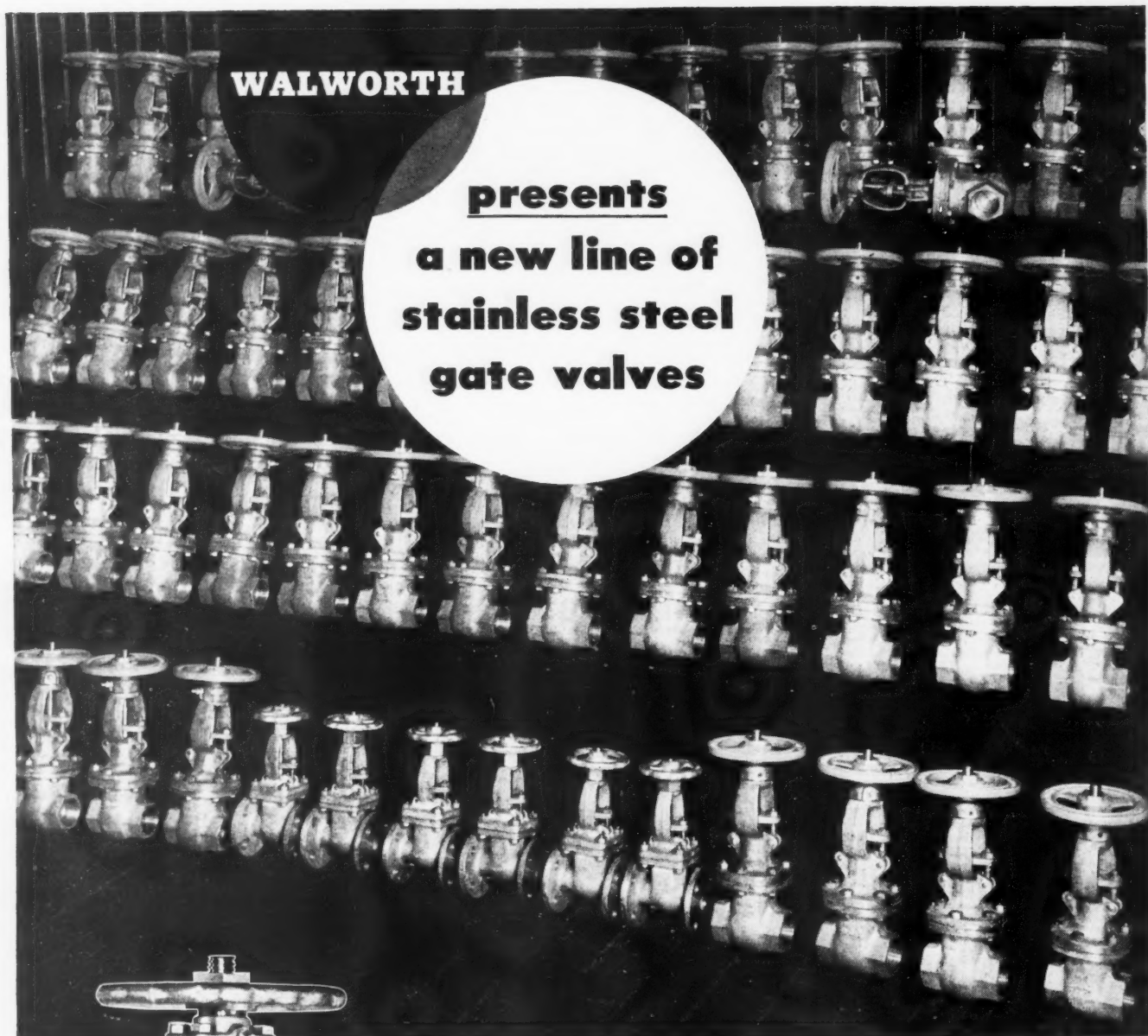


ROLL CRUSHER—High speed operation in quartzite, etc., chewed off former alloy in 24 hours. Stoody Self-Hardening 21 lasted a full week and does not spall even after repeated applications. Outperforms \$2.00 per pound rods.



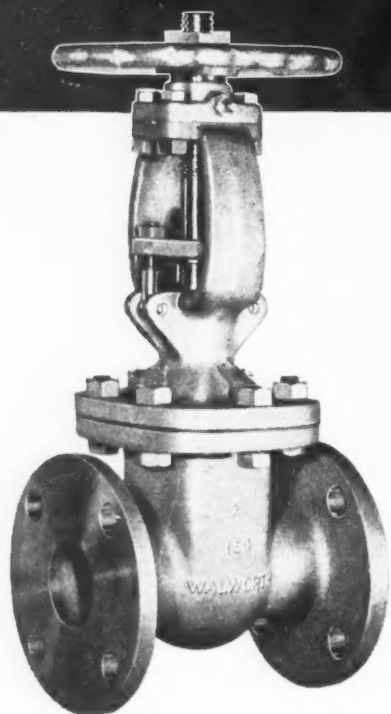
6 YARD DIPPER—Rebuilt on lips and bottom with 60 pounds of Stoody Self-Hardening 21. High abrasion resistance of alloy keeps bucket out to size. Alloy is redeposited as wear occurs to maintain operation.

STOODY COMPANY
1143 WEST SLAUSON AVENUE
WHITTIER, CALIFORNIA
Distributors in all important Industrial Areas



WALWORTH

**presents
a new line of
stainless steel
gate valves**



Walworth's *new* line of Stainless Steel Gate Valves is an excellent modern example of Walworth valve leadership. These valves combine the latest features of advanced valve design, with the traditional manufacturing skill which has made Walworth valves famous throughout the world.

See your Walworth distributor for further information on Walworth Stainless Steel Gate Valves, or Walworth's complete line of valves and fittings in other ferrous and non-ferrous metals.

WALWORTH

valves and fittings

60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



The Eaton Planetary System Minimizes the Load on Each Gear Tooth with Resultant Longer Life

In Eaton's exclusive planetary system, the gear load is divided over four planetary pinions. Hence, the pound load per inch of gear tooth face is relatively low, and possibility of fracture under severe service conditions is minimized. This feature contributes to the long life of Eaton 2-Speed Axles.

See your truck dealer for complete information.



POWER WHEN YOU NEED IT—SPEED WHEN YOU WANT IT

EATON MANUFACTURING COMPANY

Axle Division

CLEVELAND, OHIO

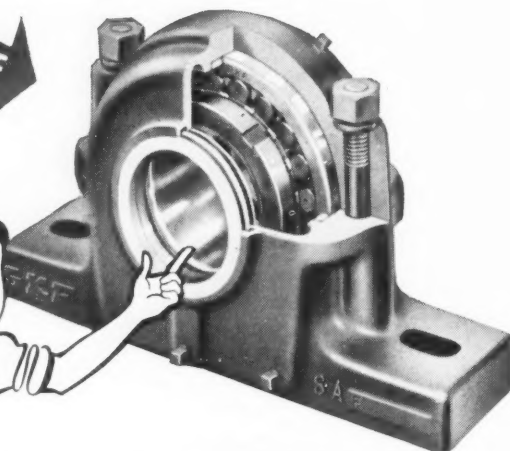
Here's what they're saying about the two HUSKIEST members of THE SKF FAMILY OF PILLOW BLOCKS

TYPE SAF

Supplied with either self-aligning ball bearing or spherical roller bearing. Equipped with SKF's exclusive Triple-Seal rings. TYPE SA—Same unit with Felt Seals.

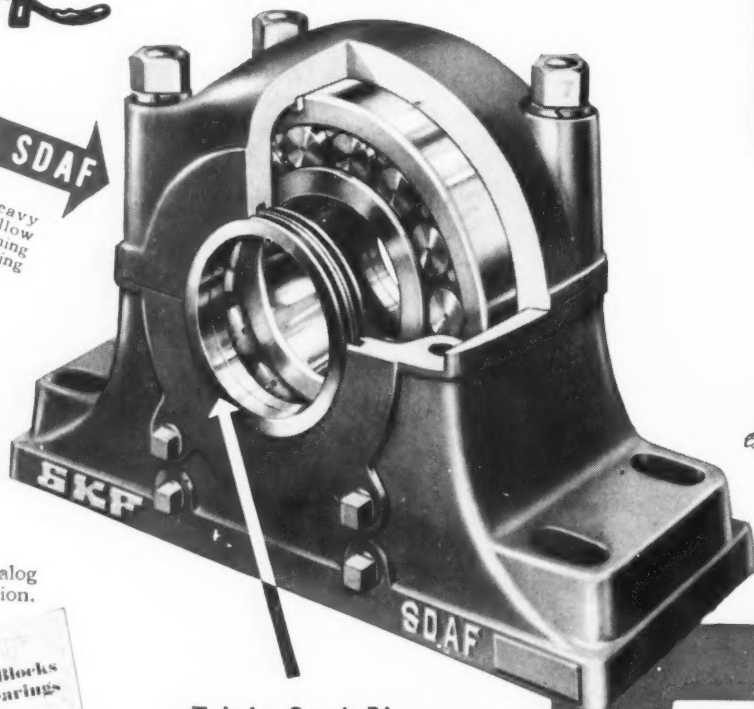


JUST THE THING FOR
HOISTS, FANS, DRIVES,
CONVEYORS, CRUSHERS,
PUMPS, COMPRESSORS,
HAMMERMILLS, ETC.



TYPE SDAF

Exceptionally heavy and rugged pillow block with self-aligning spherical roller bearing for severe loads.



AND HERE'S THE
ANSWER FOR HEAVY
HAMMERMILLS, PAPER
MILLS, STEEL MILLS,
OIL FIELDS, ETC.



● Send for Catalog
280, second edition.



Triple-Seal Rings

Two split piston rings are located on each side of the bearing assembly. Inner rings serve as internal fingers while outer rings keep foreign substance from entering the pillow block. Because these rings are not locked to the shaft, they are free to locate themselves whenever shaft expansion occurs.

"Always get SKF for the TOUGH jobs!" is a byword in mills, mines and factories where these compact, split SAF and SDAF Pillow Blocks and Bearings are now in service.

Consider SKF Pillow Blocks from an engineering point of view: Rugged, easy to install, inspect and lubricate — equipped with SKF's exclusive Triple-Seal rings to keep lubricant in . . . dust, dirt and water out!

On any job—under any load conditions—there is an SKF Pillow Block and Bearing which will make your equipment operate consistently at a lower cost.

Need some of these husky Pillow Blocks and Bearings? Write us for the name of your nearest stock-carrying Authorized SKF Distributor.

6500

SKF INDUSTRIES, INC., PHILA. 32, PA.

SKF

PILLOW BLOCKS

How to choose a mine conveyor



1 Choose it like you do a car

You buy your car as a completely engineered unit—not the engine from one source and the chassis from another. Keep that same principle in mind when you choose a mine conveyor. Buy it as a complete unit—buy the machinery from the same source from which you buy the belting.



2 Rely on one source for everything

Machinery and belting—like your car's engine and chassis—must be engineered to work together. So rely on one manufacturer for *both elements*. That way you are sure of undivided responsibility. You know that your conveyor will last longer.

3 Specify a Hewitt-Robins Conveyor

The Hewitt-Robins Mine Conveyor is the *only* one you can buy as a complete "package." You get machinery and belting engineered as a unit... and installed by Hewitt-Robins' service engineers. Hewitt-Robins is the *only* company that offers you this undivided responsibility.



4 Remember this fact—

A Hewitt-Robins Mine Conveyor lasts longer... for it is the only one engineered, manufactured, and installed as a complete unit.

What's more, it's carried in stock for immediate delivery at Passaic, N. J. or Charleston, W. Va. Call on us for information about Hewitt-Robins Mine Conveyors. Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, N. Y.—or Robins Conveyors Division, Passaic, N. J.

Hewitt-Robins Mine Conveyors

made by HEWITT-ROBINS Incorporated



Better have him check your spooling

Bad spooling, the Bethlehem man says, is like burning up hundred-dollar bills. Whenever he sees a wire rope that's improperly spooled, he knows that its useful working life is being shortened. There are few more abusive practices than bad spooling, and each time it happens it puts you in line for higher rope expense.

Maybe you never stopped to consider this angle. But here's what the Bethlehem field engineer will tell you:

When wire rope is not spooled in smooth, even layers, the resulting cross-wrap can be very damaging. Rope that does not follow its true course around the drum is subject to unnatural pressures that crush and distort. A crushed rope soon becomes unsafe and is headed for the scrap pile. This means needless expense—money that could have been saved had the proper steps been taken.

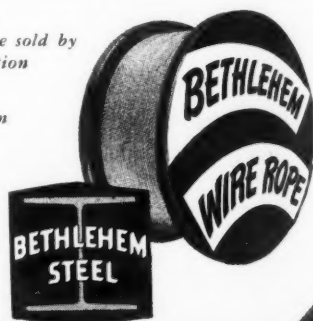
If you're having spooling trouble, ask the Bethlehem field man to look over your set-up. Usually he can help you iron out the trouble in short order. And later, when it's time for new lines, he'll be glad to recommend the sizes, grades, and types of ropes that will do the best job for you.

He's available through your nearest Bethlehem sales office or distributor. When you need his help, telephone. His services don't cost you a penny.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

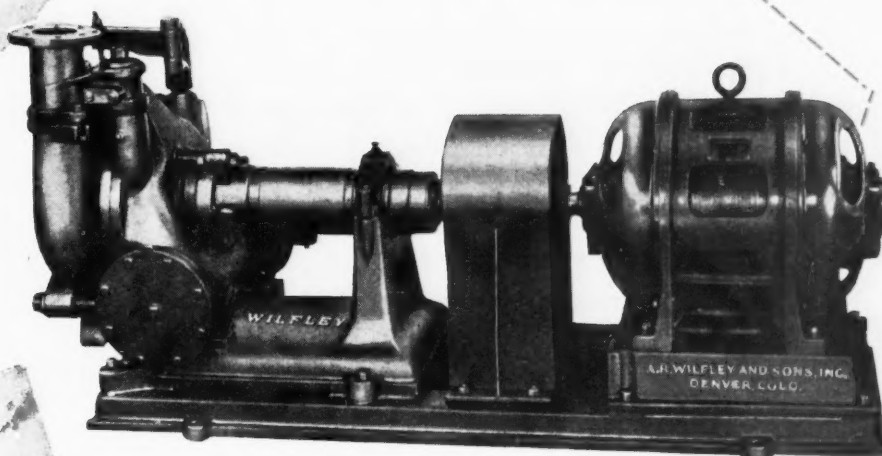
*On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation*

*Export Distributor:
Bethlehem Steel Export Corporation*



When you think WIRE ROPE . . . think BETHLEHEM

COST-SAVING

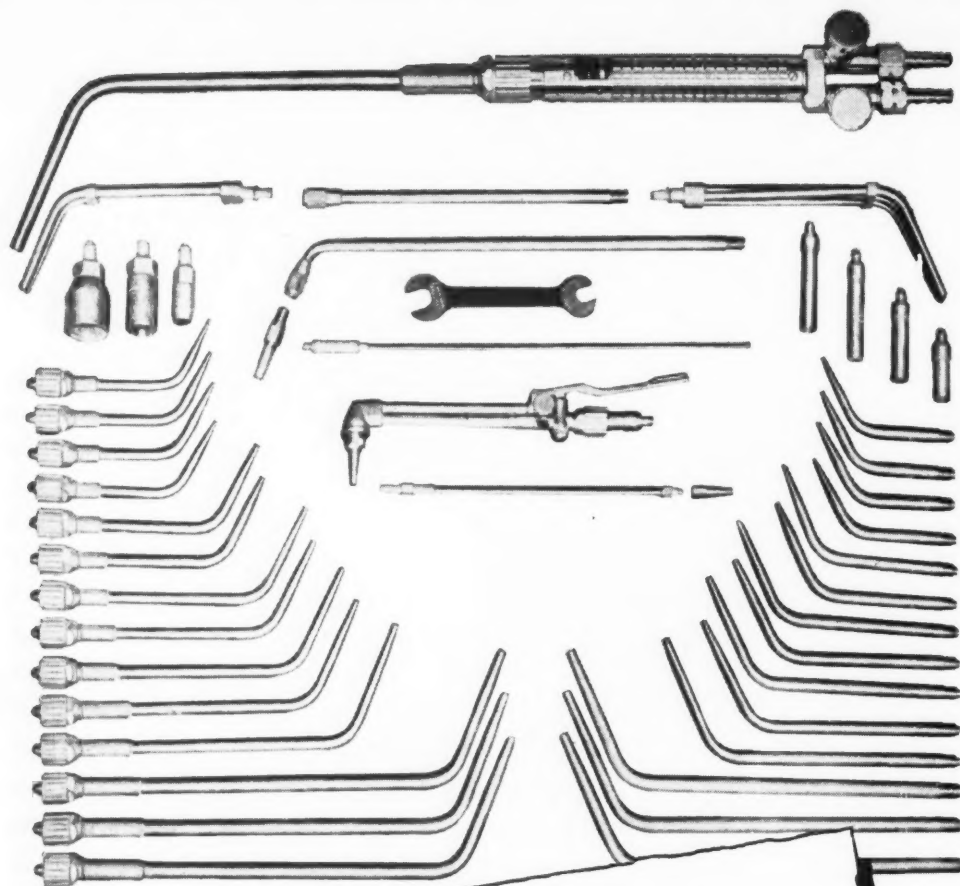


Where cost-saving efficiency is the prime consideration, specify WILFLEY pumps. Precise engineering that keeps pace with continually changing demands, exclusive features of design and construction, continuous pioneering and research, all combine to make this the dependable, trouble-free pump that delivers uninterrupted performance day after day and month after month without attention. Heavy pumping parts of rubber, alloy iron, alloy steel—whatever material works best on your job. Individual engineering on every application. WILFLEY is the pump to buy for low-cost operation and full-scale production. Write or wire for complete details.

WILFLEY
centrifugal PUMPS

A. R. WILFLEY & SONS, INC., DENVER, COLORADO, U. S. A.

New York Office: 1775 Broadway, New York City



Here is Airco's **New** Torch for
Heavy Duty welding...
 heating... brazing

The new Airco 800 Torch is designed for tough, *heavy-duty* jobs. As shown in the illustration, the torch operates with a complete range of welding tips (with or without individual mixers) as well as heating, brazing and a variety of tips for other uses. No other torch can offer this wide operating range.

The torch head is of durable, long-wearing monel metal; thus fewer torch head replacements, and lower maintenance costs result. The general design of the new Airco 800, plus flexible 1/4" or 5/16" I.D. hose, assures perfect balance and ease of manipulation... lowered operator fatigue.



With the addition of a cutting attachment, the Airco 800 is easily converted to handle general shop cutting work.

If you would like more information about this torch, or a **FREE demonstration** right in your own shop, address Dept. CA-8471, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California.



AIR REDUCTION

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

a Cable is no Stronger

THAN ITS WEAKEST SPLICE

"Till Death Do Us Part"

A good cable splice is like true love . . . the cable will live happily ever after. A good splice, too, is a job well done. It won't let you down when you need power and means a safer cable.



No, we don't recommend throwing away a cable rather than making a splice. But, we do say that it will pay to spend more time making a good splice . . . one that will keep your mine cable in service longer without the danger of electrical "shorts" and lost production from "down-time."

Perhaps the posters shown here will help bring home to your mine people the importance of a good splice. They are yours for the asking, without charge. These posters in convenient 11"x14" size for bulletin board use are offered as a service to the mining industry and in the interest of mine safety and economical operation. You simply need to use the coupon below, or write to Department C, Rome Cable Corporation, Rome, New York, for your requirements.

A Poor Cable Splice is Like Money in a Torn Pocket

It won't be there when you need it most. Take time to make a good splice and have a power line you can depend upon.



A Sloppy Cable Splice is Like a Shotgun Wedding

It's 10 to 1, the "sparks" will soon be flying . . . and sparks in a mine aren't good. Make that splice one which will give safe and lasting service.



FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK



ROME CABLE CORPORATION

DEPT. C, ROME, NEW YORK

Please send me each of three Safety Posters on Cable Splicing for use in our mines.

Name Title

Company

Street

City State

Handling of Coal..

THE NEW SANFORD- WAY SEALED "AUTOMATIC"

Here's another BIG one. A recent advertisement showed you our 30 Ton S-D "Automatic"

One of our super cars built for Consolidation Coal Company (Ky.). An eight-wheel S-D "Automatic" dumping car through which TWENTY-FIVE TONS of coal, including surcharge, are dumped in an instant. Doors are "Jerk-out" mechanism.

CONSOLIDATION COAL COMPANY (KY.)

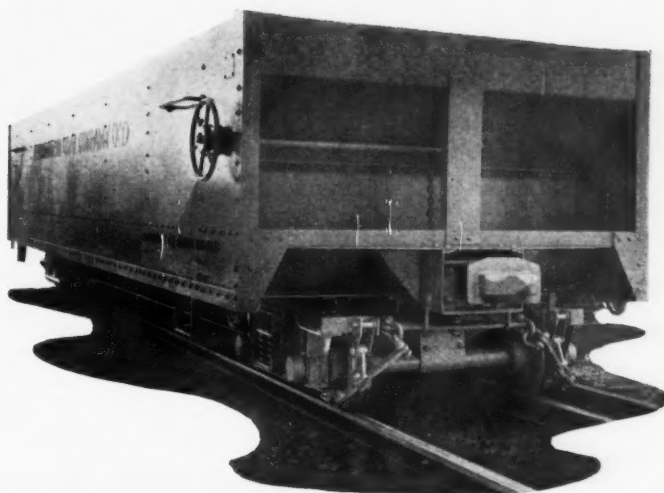
ANOTHER FIRST BY SANFORD

without losing an ounce of dust

car with two unlatching hooks for fool-proofness and safety. Furthermore, this big car is completely sealed against dust leakage. Prevents coal dust from sifting out and accumulating on track bed. Eliminates costly track clean-up . . . means safer, dustless haulage.

The car is equipped with Ohio-Brass Automatic Couplers, Timken Bearing Trucks and parking brakes on one 4-wheel truck. It measures 30 ft. in length; 8 ft. in width and is 6 ft. 2 in. high above rails.

If you are thinking of changing over to BIG cars, you cannot afford to overlook S-D "Automatics" . . . unquestionably the industry's most modern and efficient mine car.

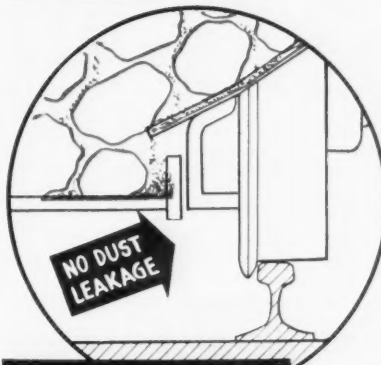


The conventional Construction. Note as vibration shakes coal dust down side of car it naturally dribbles through space between door and frame, to track bed.



Conventional Automatic

Note in our SEALED car, construction dust is carried across space by our patented "dust-roof". Dust is deposited in door to be dumped with other coal.



S-D's New Sealed Automatic Design

Sanford-Day Iron Works

KNOXVILLE

TENNESSEE



...After Hauling Heavy Tonnage for 23 Years

Pictured above is the locale of another great record made by a Manhattan Conveyor Belt. It is the tipple and conveyor belt gallery of the Dupree No. 1 Mine at Winona, West Virginia. Until tipple and gallery were destroyed by fire in February 1947, a Manhattan Conveyor Belt was in its 23rd year of service.

In February 1924, the Maryland New River Coal Co. installed 1056 feet of 42", 6-ply Manhattan Conveyor Belt on 514 foot centers. For the next 23 years this belt handled the total output of coal from the mine with perfect uninterrupted operation.

Records of long service in many mines have established Manhattan's reputation for "quality of materials and workmanship." Mine operators throughout the world benefit by Manhattan pioneer engineering in the construction of conveyor belts to meet regular and special conditions. Typical advancements are the HOMO-CORD "Cushion of Rippling Muscles" construction developed exclusively for conveyor belts, and the RAY-MAN Rayon Cord "Tension-Master" conveyor belt designed for long lifts.

A Manhattan Belting Engineer will study your problems with no obligation



RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

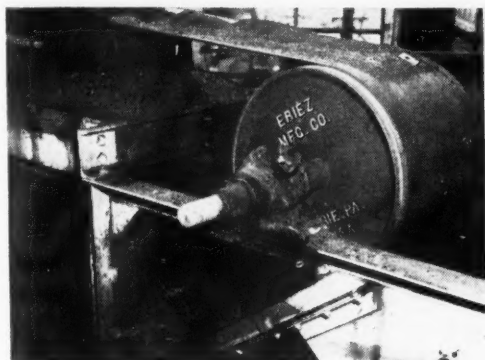
CUT OPERATING COSTS . . .

*with
Eriez*



Eriez "Giant" Plate Separator

NON-ELECTRIC *Permanent* MAGNETIC SEPARATORS



The Eriez Non-Electric Permanent Magnetic Pulley used as a head pulley in belt conveyors provides positive magnetic protection against the entry of tramp iron into expensive machines.

See our Exhibit—NATIONAL EXPOSITION of POWER and MECHANICAL ENGINEERING—Grand Central Palace, New York, N. Y., November 29 thru December 4, 1948. Booths 631-632.

DESIGNED for quick, easy and economical installation into the bottom of gravity flow chutes, Eriez "Giant" Plate Magnets permit simple and efficient removal of tramp iron at an operating cost of zero . . . First cost is last cost . . . Powered by special Alnico magnets produced under General Electric patents, Eriez magnetic strength is permanent . . . a completely self-sustaining field provides uniform high density magnetic strength across the entire abrasive-resistant magnet face . . . no electric current is needed . . . no maintenance . . . Slip rings, coils, rectifiers and other electrical accessories are eliminated . . . You get other advantages too!

Adverse operating conditions, such as extreme heat, cold or moisture do not affect the efficiency of Eriez units . . . Protect your coal preparation equipment from tramp iron damage by installing Eriez-Engineered magnetic equipment today.

CLIP AND MAIL TODAY
Please send bulletin No. 102B

CA-10

We would like to know more about installation of ERIEZ on:

- ☐ Gravity Conveyors ☐ Mechanical Conveyors
☐ Equipment on Processing Machines

Name

Address City State

● *When It's Magnetic Protection . . . See Eriez First*



ERIEZ MANUFACTURING COMPANY

60 East 12th Street, Erie, Penna.

Only Dodge Builds "Job-Rated" Trucks



VISIT THE BIG DODGE "JOB-RATED"
TRUCK AND EQUIPMENT SHOW
Madison Square Garden, New York City
November 18-21, 1948

"Job-Rated" TO SAVE MONEY...

You'll save money with a truck that's built to fit your job. Any truck that's too big for its job, will waste gas and oil. Or, if it's too small it won't stand up . . . maintenance costs will be excessive. There's no need to drive expensive "misfits." Just see your Dodge dealer. Tell him what you haul . . . the weight of your loads . . . and your hauling conditions. He will recommend the right "Job-Rated" truck for your job.

"Job-Rated" TO SAVE TIME...

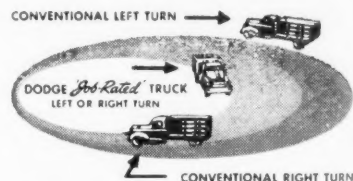
Dodge "Job-Rated" trucks save valuable time, too, simply by keeping out of the repair shop. They save time, because each truck is engineered with exactly the right one of 7 different truck engines. Each one has exactly the right clutch, transmission, rear axle and gear ratio to haul a specific load, over specific roads, with time- and money-saving efficiency.

"Job-Rated" TO LAST LONGER...

Naturally, a truck that fits the job . . . a truck "Job-Rated" with exactly the right units, from engine to rear axle . . . will last longer! This means lower upkeep costs. It also means on-the-job dependability and satisfaction. Ask your Dodge dealer to show you why the right "Job-Rated" truck can save money, save time, and last longer . . . on your hauling job!

You'll profit from these NEW features, too!

New "cross-steering," with shorter wheelbases that accommodate full-size bodies, enable you to turn in much smaller circles. You can park, back into alleys or up to loading platforms with much greater ease.



Front axles have been moved back, engines forward. More load is on the front axle . . . giving much better weight distribution. With wider tread axles, longer springs, and "Air-O-Ride" seats you get a marvelous new "cushioned ride."

New "Pilot-House" cabs, with nearly 200 square inches more windshield glass area, give tremendously increased vision . . . and safety!

For the location of the Dodge dealer in your community, consult the yellow pages of your local telephone directory

DODGE "Job-Rated" TRUCKS

a thousand and one

job-proved wire ropes

There's a Macwhyte rope
that's the right rope
for your equipment



Use PREformed Whyte Strand for easy handling and longer service.

Macwhyte Distributors and Mill Depots — carry stocks for immediate delivery. For maximum safety, service and economy, ask Macwhyte representatives to recommend the correct rope for your equipment. Catalog G-15 on request.

**Macwhyte
Wire Rope**

NO. 900

MACWHYTE COMPANY

2931 Fourteenth Avenue • Kenosha, Wisconsin

Manufacturers of

Internally Lubricated Wire Rope, Braided Wire Rope
Slings, Aircraft Cable and Assemblies.

Distributors throughout U. S. and other countries.

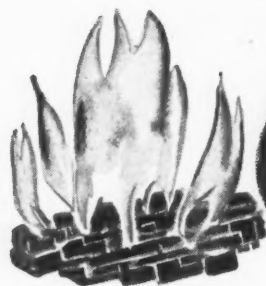
Mill Depots:

New York
Pittsburgh
Chicago
Minneapolis

Fort Worth

Portland
Seattle
San Francisco
Los Angeles

THE MAGIC



OF COAL

NATIONAL in scope . . .
make it **LOCAL** in effect!

Here's how **YOU** can get
this important film to
show in your community

Also Available —

Speakers Bureau
Classroom Helps
Women's Club Programs
Newspaper Materials

This 18-minute, 16-mm. motion picture . . . giving a dramatic view of coal and coal mining, from modern mining methods to uses of coal and its by-products . . . is available *now* for business meetings, school groups, and club showings in your community. It is another way to tell the important story of bituminous coal to all your customers and potential customers.

Here's an opportunity! With this film, you can make the national program of the Bituminous Coal Institute *your* program . . . for the sake of a better *local* understanding of your industry.

Just tell us you're interested, as a coal operator or retailer, in localizing the educational program of this Institute. We'll send you full details and help you in every way we can.

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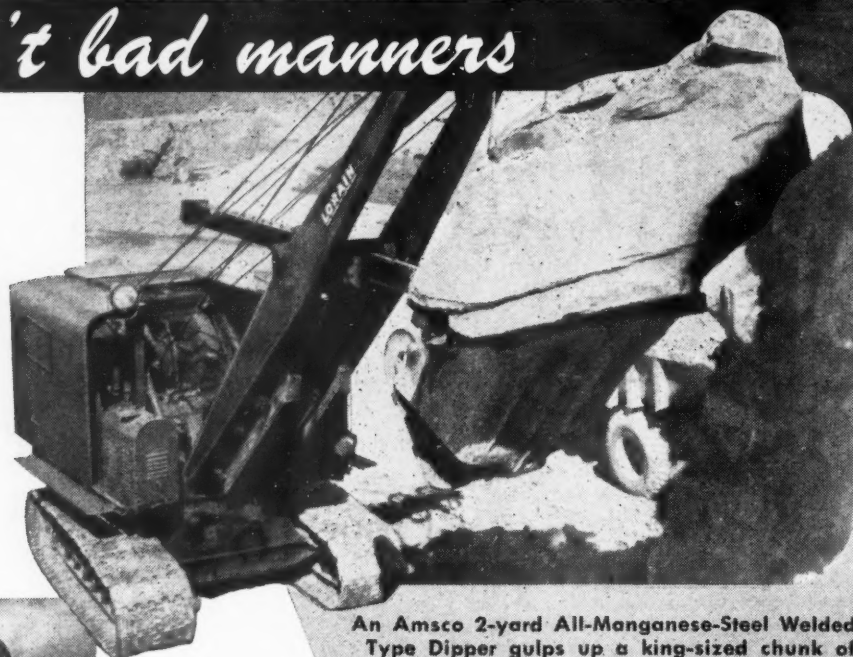
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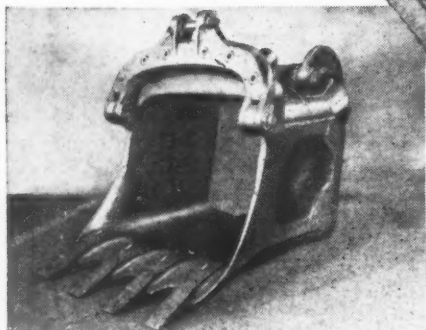
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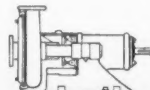
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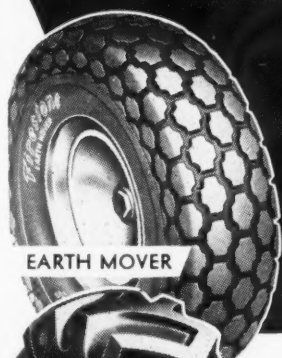
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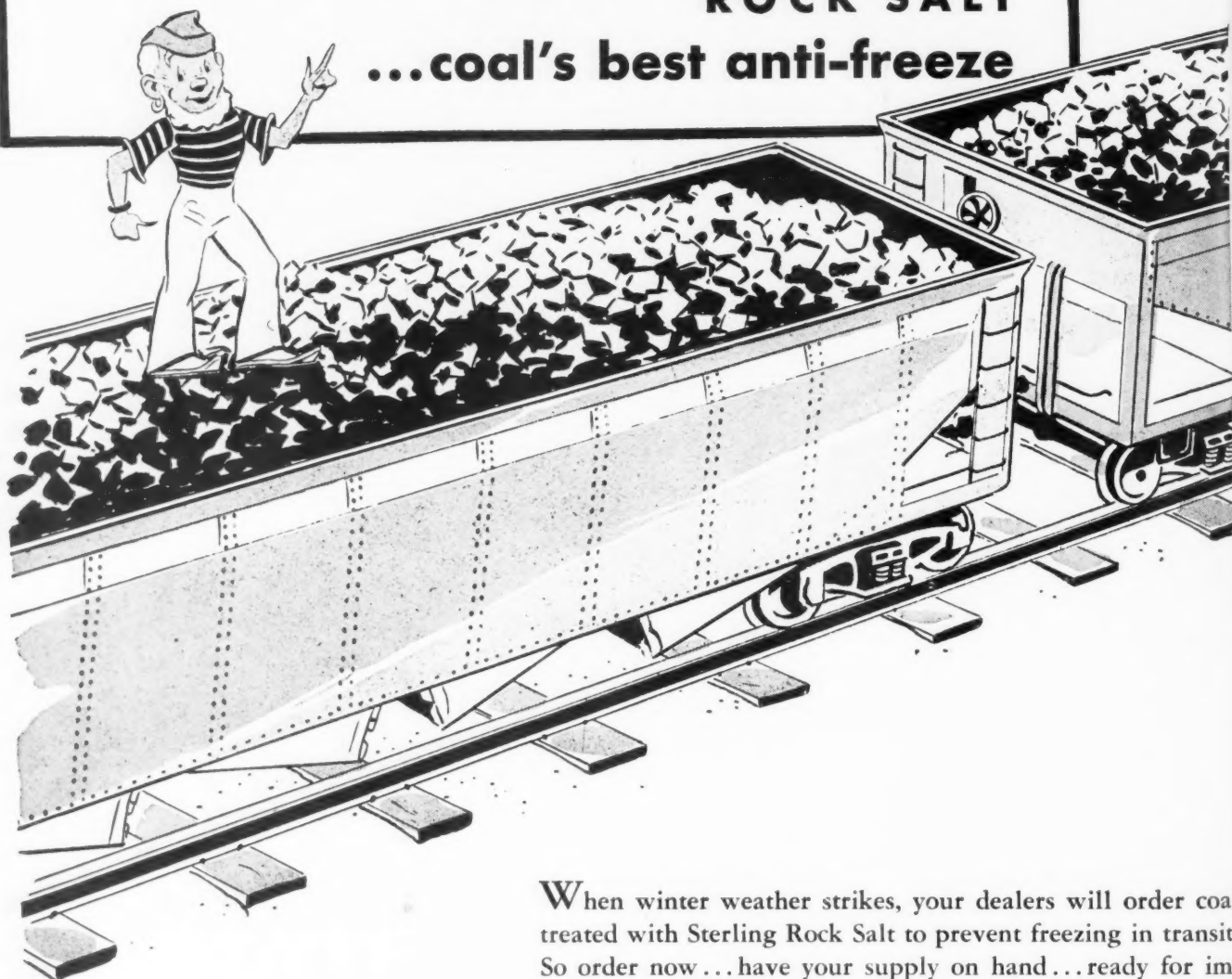
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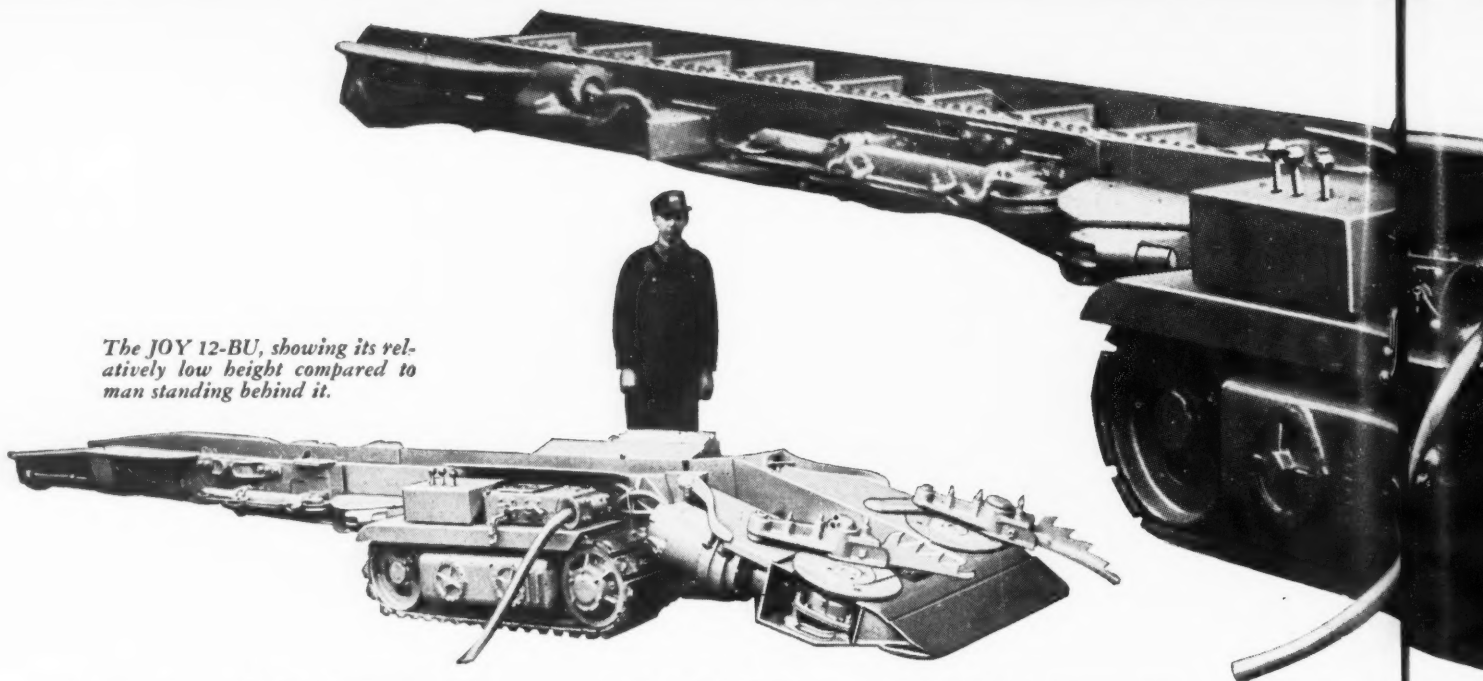
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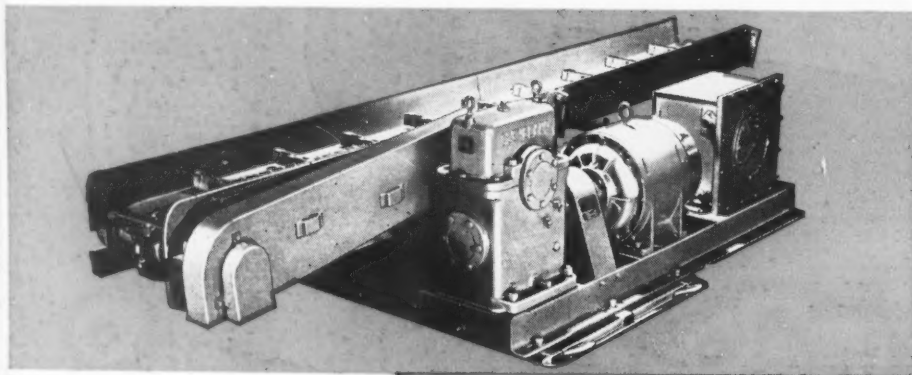
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The JOY 12-BU, showing its relatively low height compared to man standing behind it.

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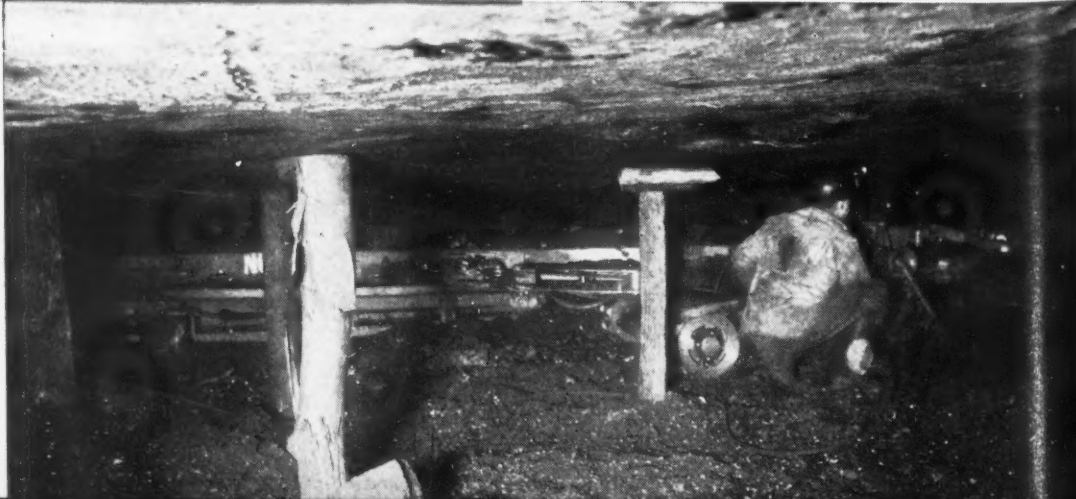
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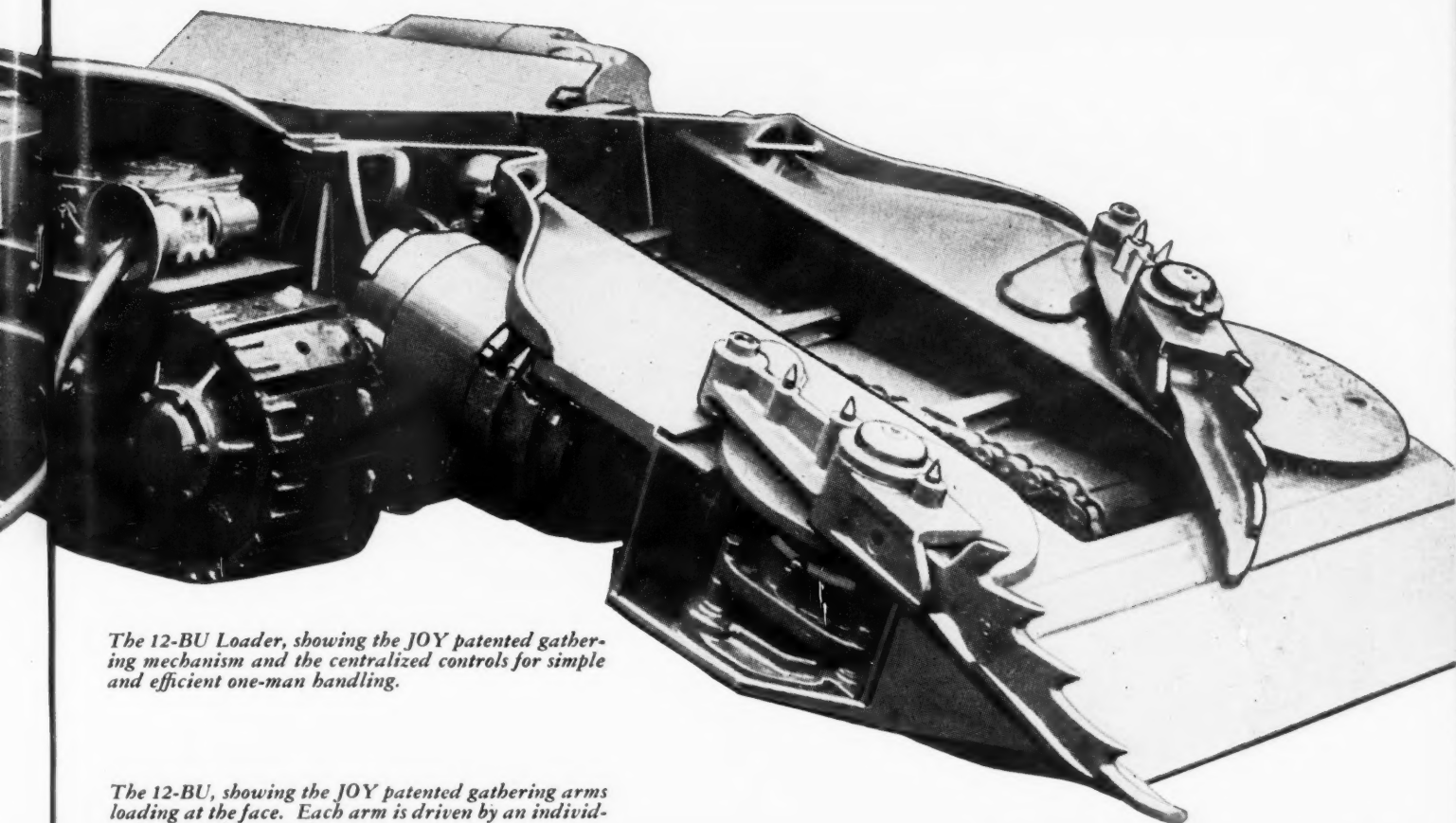


Perfect mate to the 12-BU in thin-seam mining—the JOY 15" Chain Conveyor. Cut shows driving mechanism. Sections may be added for any desired length.

The 12-BU Loader working in a thin seam. The caterpillar treads are driven by individual motors. Permissible electric construction throughout... all parts in control system readily accessible.

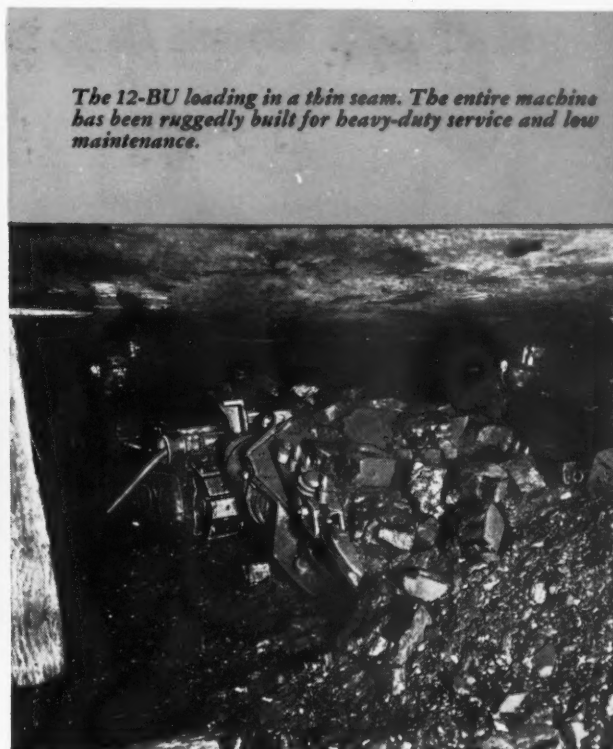
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The 12-BU Loader, showing the JOY patented gathering mechanism and the centralized controls for simple and efficient one-man handling.

The 12-BU, showing the JOY patented gathering arms loading at the face. Each arm is driven by an individual permissible-type electric motor.



The 12-BU loading in a thin seam. The entire machine has been ruggedly built for heavy-duty service and low maintenance.

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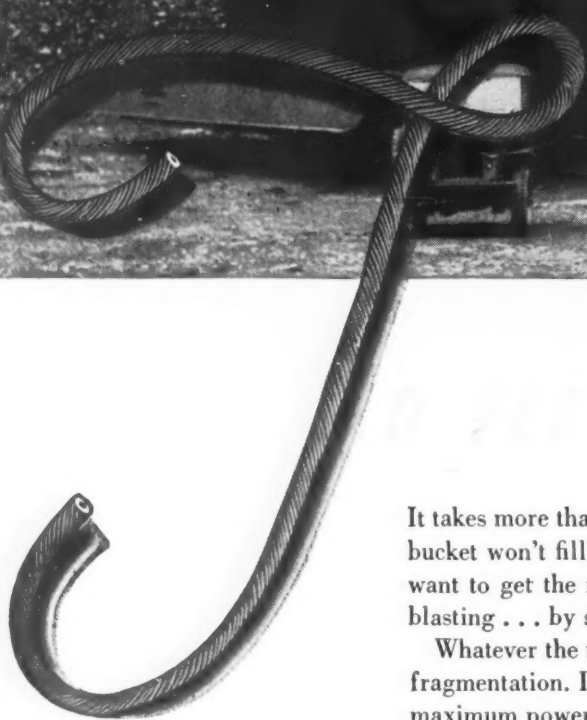
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OCTOBER, 1948

IVAN A. GIVEN, EDITOR

Critical Day

THE NATIONAL ELECTION of 1948 can rightly be termed critical. The months since the end of fighting with Germany, Japan and their satellites have made clear what the policies of the present administration mean on both the foreign and domestic fronts. Even if the opposition platform was not equally clear, the administration record, along with its platform, provides something definite upon which to base a judgment before going to the polls this fall.

One big question before the voters again this year is whether or not the federal government shall be permitted—in fact, directed—to grow in size and in dominance over every thought and action of the individual. The present administration insists that it should and a new minority party makes it even more emphatic. To promote acceptance of that idea, both are coupling promises of special privileges to special groups with attempts to create fear of the consequences to those same groups if their programs are not accepted or perpetuated. In short, millions of citizens are being cajoled or threatened to induce them to abandon personal responsibility for their own fortunes in favor of letting the federal government do with them as it wills.

On the foreign front, the United States fought in World War II to achieve the basis for a lasting peace. It had a real opportunity to achieve and maintain a position that would enable it to work effectively toward that goal. What is the picture now? The present administration failed miserably in capitalizing on its opportunity with the result that today our effectiveness has been largely dissipated and we find ourselves in a very difficult if not actually perilous situation. Certainly we are not any closer to real peace under the present administration, while the new minority party claims that we should compound our troubles by

further appeasement and weakening of our defensive power.

These are some of the things that must be considered in making a choice next election day between more of the same or a change that would provide a new opportunity for setting a course that might better serve the interests of all of the people of all the United States. This year is a real decision year. More than ever it demands two things of every citizen: (1) sober analysis of party records and platforms, and (2) putting the conclusions into effect by voting Nov. 2.

Always Vital

FOR THE SECOND YEAR since the end of hostilities, coal has been "enjoying" a mild but normal summer recession in business. As is normal, also, there have been a number of statements that prices are skidding and the industry is in for trouble. However, since the production level this summer is well above that of last, it is difficult to see that a setback has occurred. The facts are that only a small minority of producers have suffered as a result of the combination of seasonal decline and moderate capacity increase since the war, *plus poor coal or poor or no preparation.*

Once again, therefore, the events of the past summer have demonstrated the risk involved in neglecting coal quality. When a user has a choice, he can always be depended upon to select the higher-quality product, especially if the price is the same or not much more. The problem is one for everybody connected with the production, preparation and sale of coal, including even the miner. It is bad enough when the business goes to another mine with better preparation, but it is even worse when the user gets disgusted enough to change to another fuel. Now if ever is the time for everybody to bear down on preparation.



MINE MANPOWER will not be seriously cut by the draft, which probably will call up only 0.5 percent of the nation's labor force before July 1, 1949. That means about 2,500 miners, barring possible deferments.

Coal and Defense

Defense Program as Now Geared Will Take Few Miners, Add Little to Present Equipment Shortages—But Draft Act Packs a Big Wallop if War Clouds Gather—How Coal Can Get Ready for What's Ahead

THE NEW NATIONAL DEFENSE PROGRAM, as it stands now, will create no major problems for the coal industry. Although the National Selective Service Act of 1948, passed by Congress last June 24, vests the President with sweeping powers over men and industry, it fixes the scale of defense preparations at such a low level that his powers probably will be held in reserve, until and unless the course of international affairs compels him to crack down. Russia's behavior, of course, could change the picture quickly. But for the time being, top-level executive policy in Washington is to depend on industry's voluntary cooperation.

Briefly, the facts of the defense program are these:

1. In its first year, the draft will take only 225,000 to 250,000 men

aged 19 to 25, inclusive—about 0.5 percent of the nation's total labor force of 45,000,000 men.

2. In general, men with wartime service records are exempt from peacetime service, as are members of the National Guard and the armed forces reserves.

3. Deferments are allowable for men in essential jobs and for those who have dependents.

4. The Act does not authorize wage or price controls.

5. The only industry singled out for allocation of its products is steel. The President's powers to assign priorities, seize plants and allocate materials are broad but voluntary cooperation by industry is his announced policy at present.

6. Steel requirements of the military, instead of biting into civilian needs, will be just about offset by

new steel capacity that will be brought in this year and next.

The big sleeper, naturally, is the international situation. Just now, our defense program is only a token—a modest muscle-flexing act calculated to convince the Russians that we mean business. But if we go all-out for arming Western Europe, or if we stumble into a shooting war, all bets against industrial and civilian upheavals are off. The bigger the military program, the tighter the controls on materials, production, wages, prices, distribution and manpower.

However, barring guns and plans for Western Europe and outright war with the Reds, it is pretty certain that our military program can be absorbed without seriously upsetting the civilian economy.

Take a more detailed look at the manpower draft. The President is authorized, after Sept. 24, to induct enough men to bring the armed forces up to a newly authorized strength of nearly 2,200,000 men. Since this is an election year, no one is likely to be inducted until after the middle of November. Draftees will spend 21 months in



TIGHT STEEL SUPPLY will hold steady, with new capacity about equal to military needs. Mobilization of other industries is not yet in the blueprint stage, but government is urging plants to make paper plans for M-Day.

training and service, after which they will be held in the reserves for five years. In reserve status, however, they will perform only limited duties that will not interfere with their home life or their regular jobs.

The draft will call up few if any veterans of World War II. Any man who served honorably for as much as 12 months between Sept. 16, 1940, and June 24, 1948, or for as much as 90 days between Pearl Harbor and Sept. 2, 1945, is automatically exempt. Likewise, the Act exempts any man who on June 24, 1948, already was a member of the National Guard or an active reserve unit or who after three years' service may be discharged subsequent to June 24, 1948. The sole surviving son of a family that lost one or more children in the armed forces is not to be drafted under any circumstances.

Under the broad terms of the Act, deferments may be granted to men in agriculture, industry or other employment whose work is judged essential to the national safety, health or interest and to men who have dependents (financial support is not the sole consideration in determining dependency) or wives or children with whom they maintain a family relationship in their homes. High-school students may

be deferred until they finish high school, reach 20 years of age or drop out of school; college students until they reach the end of the current academic year or until they drop out of college, whichever date is earlier. Possibly, students attending college on coal-company scholarships, being engaged in scientific work, might get deferments until their course is complete. With less than a quarter of a million young men to be drafted this first year, it is reasonable to expect that most if not all men in deferrable categories will be deferred at least for a while.

Bearing out this view, the President, though the Act forbids blanket deferments, on Aug. 21 issued an executive order automatically deferring all married men, all men with dependents and most farmers. However, single men in industry, to be deferred, not only must be working in jobs essential to the national health and safety but also must be indispensable and irreplaceable in those jobs, according to the President's ruling.

Even so, liberal interpretation of the Act's deferment provisions can reasonably be expected by local boards as long as enlistees keep military manpower close to authorized strength. General Hershey, draft administrator, has assured

industry that there is no cause for concern over manpower requirements.

The young miners who put on a uniform before July 1, 1949—about 2,500 of them, assuming a normal age distribution in the coal mines—will not hurt much. For example, a mine employing 500 men may expect to lose two or three men to the draft. Since the more complex machines in a coal mine usually are run by older men, the dropping out of a few youngsters is not likely to slow down operations.

Yet the departure of even these few men is an opportunity for company officials to strike a few blows for better labor relations. A draftee, as well as any man who enlists, should be given a good send-off, including the best wishes of company officials and their assurances that his old job will be waiting when he sheds his uniform. While he is in the service, he ought to hear from his company often through the company newspaper or magazine and through personal letters from the president, the superintendent or the foreman. It would be a good idea also for company officials to keep in touch with his family, if they live close by. In some ways, the draftee's absence from home and job will not be greatly different from what it was

for others three to six years ago—he leaves his familiar surroundings and moves into a strange environment and a new routine. For a while, at least, he may be lonely and confused. A word from the men he knew on the job may well cheer him up in camp and make him look forward to returning to his old job.

Draftee's Job Guaranteed

When he does come back, the Act guarantees re-employment rights to the draftee. That is, if his job at the time he was drafted was non-temporary, he must be put back on the payroll and he may not be discharged within a year after returning. All he has to do is ask for his old job back, making his request within 90 days after the armed forces turn him loose. His employer must give him his old job or one with similar seniority, status or pay; or, if the man is not able, because of some service-incurred disability, to perform his former duties but can do some other job, his employer must give him a job, with similar seniority, status or pay, as much as possible like his old job. The Act directs that men who return to their former employers must be treated as if they had been on furlough or leave of absence; that is, no loss of seniority and full participation in all insurance and other benefits offered by the employer, just as if employment had been continuous during military service.

The Act grants these same re-employment rights to men who enlist after June 24, 1948, provided it is the first enlistment subsequent to passage of the Act; and to reservists who are called to active duty. The employer has only one "out"—if he refuses to re-hire a draftee, an enlistee or a reservist, he must prove that his business has changed so much that re-hiring is impossible or unreasonable. Coal operators, however, are not likely to quibble on this issue but are more likely to welcome the man back to his job and seize the opportunity to cement good labor relations.

There is no need for a lot of fuss and fanfare in welcoming a peacetime serviceman back to work. It should be enough to call him into the front office for a personal welcome and a talk about his service experience and his place in the company. The chances are that he will be a better man for his 21 months in the service and it is possible that the things he learned as a soldier,

a sailor or a marine may have equipped him for a better job than he had when he left.

In addition to setting up a draft for men, the Selective Service Act of 1948 also sets up machinery for a partial mobilization of industry. However, the powers granted the President and government agencies are discretionary and, as pointed out earlier, the administrative policy thus far is to go easy. In a letter early in July to Secretary of Commerce Sawyer, President Truman declared that he preferred to rely on "voluntary cooperation" within industry rather than on government-imposed allocations in a program "of this limited size."

But the Act does pack a lot of dynamite if the President chooses to use it—power to set up priorities for materials and supplies for the armed forces and the Atomic Energy Commission and power to seize any plant, mine or facility and operate it in case of its failure to provide such materials and supplies, paying a fair price for articles or materials as well as a fair rental for the property. His powers, in short, amount to a draft of industry at the President's discretion. The only power noticeable by its absence is control over wages, prices and rationing. It would not take Congress long to add that power if world affairs should go to pot.

For the time being, however, unless we are compelled to enlarge the defense program to meet Russia's challenge, there is likely to be little serious dislocation of industry as a whole and even less dislocation of the coal industry. If there is a pinch anywhere, it will come in steel and thus, by chain reaction, in mining machinery and supplies. Even so, new capacity of some 2,000,000 tons to be brought in by the steel manufacturers this year and next will satisfy the bigger steel needs of the military and probably leave a small margin to add to civilian supplies.

Meanwhile, in case the situation tightens up, coal's advocates—the National Bituminous Coal Advisory Council and the Anthracite Coal Industry Committee—already are in court to safeguard the industry's interests and to claim its share of any goods and materials in short supply. In mid-July, for example, the bituminous group, which was set up early this year at the invitation of Interior Secretary Krug, reported to Mr. Krug that the bituminous industry would need 682,900 tons of steel annually for ma-

chinery, repair parts and supplies to produce 620,000,000 tons of coal. This report, after study by the Interior Department, will be forwarded to the Department of Commerce for that agency's recommendation. Later, in August, the anthracite committee met with Secretary of Commerce Sawyer and representatives of the Office of Industry Cooperation to discuss that industry's requirements of 12,830 tons of steel products for repair and maintenance of mining and preparation facilities. In short, the government, where wartime powers will be lodged if the worst comes, is being kept up to date on coal's needs and coal's claims are being pushed.

The immediate future, therefore, looks like fairly smooth sailing for coal, both as to manpower and supplies and equipment. That does not rule out the possibility of choppy seas if the defense program picks up momentum, and even heavy storms if the shooting starts. In fact, some key industries already are blueprinting their possible conversion on M-Day to wartime schedules, aided by patterns set up by the Munitions Board. This, however, is still the planning stage, with only one major industry—aircraft—having gone beyond the planning stage and into actual production.

Coal Should Plan Ahead

Yet, although the present seems peaceful, now is the time for coal to plan a future that takes all possibilities into account—the rosy prospects of peacetime production as well as the thorny problems of a wartime schedule. In either event, the industry should act in the following directions:

1. Install new machines as fast as possible to guarantee top efficiency and peak output.

2. Boost capacity to meet growing peacetime needs or heavy military demands with equal dispatch.

3. Stabilize labor relations on the local and national levels to avoid wildcat stoppages and nationwide strikes, which are distressing in peacetime and may well be disastrous in war.

4. Back up the bituminous and anthracite advisory bodies in their studies of coal's needs and in their drives to provide adequate equipment and supplies for mining coal.

Coal has never yet failed in its obligations to the nation in peace or war. With courageous and far-seeing leadership, it will measure up again when called on.



SAFE SHOOTING, TIMBERING AND GAS DETECTION come from work habits drilled into supervisors and miners.

Training for Safety

Human Factor Swings Big Weight in Mine Safety—The Right Work Habits and Mining Know-How Are Needed by Supervisors and Workers—How Some Virginia Coal Companies Make Miners Safety-Conscious

By DR. B. H. VAN OOT

State Supervisor

Trade and Industrial Education, Richmond, Va.

CONSTANT ASSOCIATION with hazardous conditions often makes people oblivious of those hazards and thus creates a contempt for danger. This is true in all activities of life—crossing a street in traffic, playing football, driving a car and working in industry. It is especially true in the coal-mining industry, where workers are surrounded by dangerous conditions on all sides. Rocks can fall on the miners, coal can fall, coal cars can crush them, a wire can electrocute them or an explosion can blot out their lives.

Much has been done to minimize these hazards from an engineering

point of view by standardizing methods of performing various jobs, rock dusting, detecting gas, providing adequate ventilation, planning mines efficiently, standardizing methods of fighting mine fires and performing rescue work after an accident has happened. Emphasis in all these services has been placed on the physical aspects of mining and without a doubt these safeguards and methods have contributed much toward preventing accident. Mechanical contrivances, however, are not sufficient. Human nature being what it is, men will take chances, ignore regulations, take short cuts to production, work without centering their thoughts on their job and do many things that are not safe, getting by for a while regardless of the ulti-

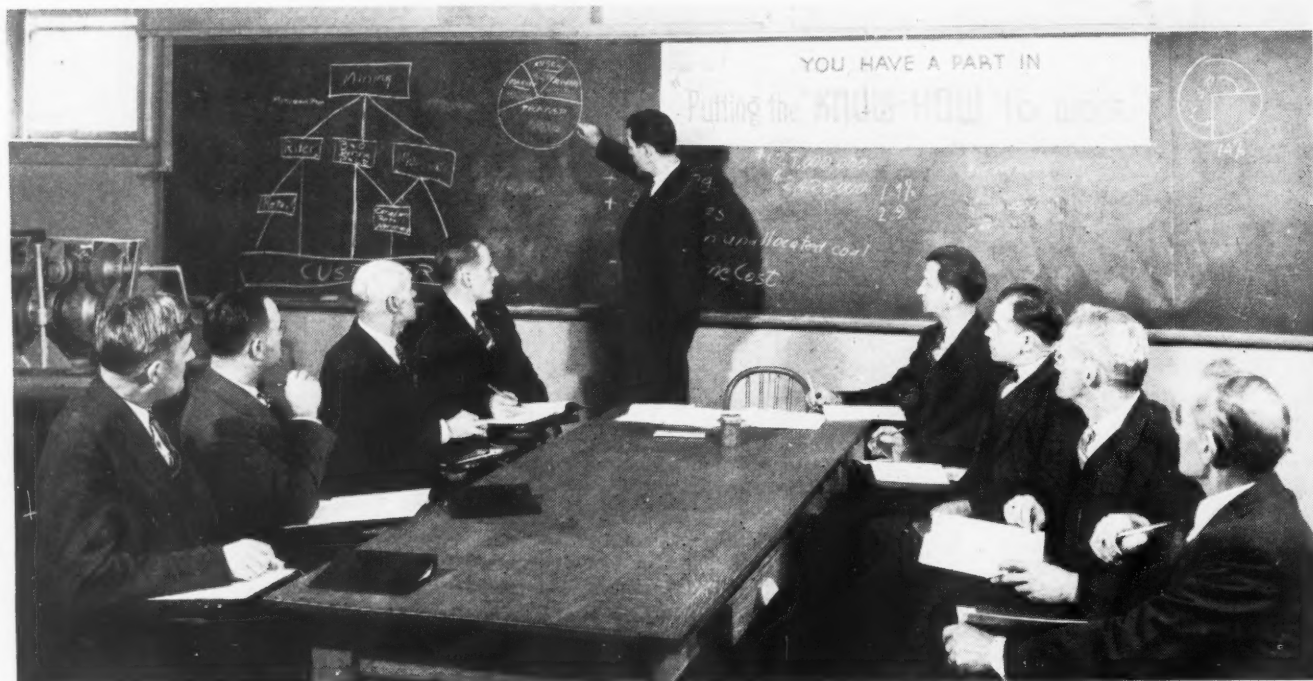
mate effect upon themselves and their fellow workers.

The working men, however, are not the only ones who take chances in the hope of getting by. If the account of the Centralia mine explosion in Illinois is accurate, the finger of guilt points also to the management, the mine inspectors, the union officials, the personnel of the state mines department and even to the federal government. One of the mine inspectors, to be sure, was decidedly on the job but could get no action from his superiors, the management or the state and federal agencies concerned. Many comparable examples could be cited. They all point to the need for education and training.

At the conclusion of a foremen-training class conducted in one of the larger coal companies in Virginia, the vice president of the company told the foremen, among other things, that the purpose of the training class was to teach them how to use their heads. He then called upon several foremen to tell what benefits they had received from the course. After enumerating several benefits he had received, one foreman stated facetiously, "The previous speaker has said that one of the purposes of these conferences is to teach us to use our

Abstract of an address at the 1948 Annual State-Wide Safety Conference of the Commonwealth of Virginia.

Trained Foremen the First Step to Mine Safety



GOOD TEACHING METHODS and knowledge of human relations make foremen better safety instructors.

heads. I wonder if a similar conference might not be good for the management."

Though this foreman made his remark in good humor, he raised a serious question. Several of the managers in the coal industry in Virginia are keenly conscious of the need for training for themselves and their supervisory personnel and have done much to institute these programs. Those who have set up programs are making enviable safety records. But not all mine managers have followed suit.

What would be the type of training most beneficial to management and supervisory personnel? Here are some of the keystones:

1. Mine management requires a knowledge of sociology. The mine worker whose mind is centered on trouble at home, on neighborhood disagreements, on the delinquency of his children, on his relations with his union or his fellow workers, on his future status after he is too old to work in the mines—this man is a dangerous worker. A management man has certain responsibilities toward these conditions, both as manager of an enterprise and as a citizen in the community.

2. Mine management requires a knowledge of federal and state laws. The effects of these laws on production, working conditions, the attitude of workers, markets, operating costs and mining methods are matters that should be thoroughly understood by top manage-

ment and all supervisory personnel.

3. Mine management demands a knowledge of psychology. If the mine manager or the mine superintendent and foremen understood more thoroughly the effects of their tone of voice, their friendliness to workers, their methods of giving directions and orders, their relationships with others in the community and the industry, and even the manner in which they speak to or look at their fellow workers, they would better understand the attitude of those who are associated with them.

4. Mine managers and the supervisory personnel should know how to teach. Managers, superintendents and foremen, although their main job is to produce coal, also are teachers. To know how to give instructions so that they will not be misunderstood, to know when the recipients of those instructions understand what is told them, to know how to check on the results of instruction, to evaluate the attitude of the workers after instruction, to organize instructional material in a logical manner, to conduct group meetings with maximum beneficial results—these skills help greatly in promoting safe work practices as well as in producing coal.

5. Mine managers and supervisory personnel, regardless of their proficiency, must develop leadership, promote cooperation, institute programs to develop good per-

sonnel relationships, make analyses of jobs and develop job pride, whether that pride is in having the safest mine in the state or in setting up a safety prop or laying track.

All of these topics—sociology, psychology, legal aspects of mining, teaching, analyzing, developing leadership and cooperation, developing job pride and promoting personnel relationships—could form the basis of a course of study the results of which would help promote safety and good will. The following unsolicited letter from the late J. D. Rogers, Stonega Coal & Coke Co., Big Stone Gap, Va., illustrates the value of training and shows how mine management courses have a direct bearing upon mine safety:

"Our records show that from the beginning of the foremen's conferences, a decrease in the number of accidents was very apparent. I recollect very distinctly the first of these conferences where accident prevention was stressed. A decrease in the number of accidents at that colliery began immediately. The next colliery to secure the conferences showed a like result and this improvement was shown at every colliery immediately following a series of conferences. Prior to these conferences, it was the exception when we had a colliery to go through the month without a lost-time accident. At the present time, the opposite is true—it is now the exception when a colliery has a lost-

time accident during any current month. During the month of May this year, six out of seven collieries operated the entire month without a lost-time accident.

"Aside from the decrease in the number of accidents per ton that we have experienced, resulting, we believe, from our foremen's conferences, we think that the morale of our employees is much higher than it was previously and that the men take a greater interest in their work and are more efficient from every standpoint."

Miner Instruction Vital

To promote safety, technical instruction for the mine workers is even more important than the instruction of the supervisory personnel. Many accidents come about through ignorance, and probably more through carelessness. These accidents can be prevented if workers are given instructions in the technical aspects of mining and are taught the proper habits for performing their work. For instance, the men should be taught that if they feel a tightness across the forehead or a slight headache, see the blood vessels in their skin become dilated, have a throbbing in the temples, feel weak or dizzy, have dimness of vision or feel nausea, they are breathing carbon monoxide. If their eyes and respiratory passages feel extremely irritated, the air has too much sulfur dioxide. So it is with other gases. Each has its peculiar characteristic and may be recognized by certain symptoms. Every miner should be taught to recognize these symptoms and to act accordingly.

It has been said that chemistry is too difficult to teach to coal miners. This is hard to believe. Coal-mining instructors who have taught this subject report that they have heard their students talk about methane, hydrogen, ethane, carbon monoxide, sulfur dioxide, hydrogen sulphide and other gases as glibly as a father talks about his newborn baby. When miners can identify these gases, recognize symptoms and understand what will happen unless they act quickly and intelligently, the chances of an accident or death are greatly reduced.

In no other industry, with the possible exception of sawmills, is it more important to reduce every activity of the worker to a habit. The man who cuts himself with a razor usually has his mind on something other than his shaving. So it is in the coal industry or any other in-

dustry. The slightest lapse in concentration on the proper work method may cause a serious accident. That is why workers must develop the habit of concentrating their thoughts on the work at hand. Correct habits or correct practices can be taught through constant repetition. If a miner develops a habit of setting his safety prop correctly, he is likely to set it correctly every time. On the other hand, if he makes one exception to this practice and gets by without an accident, he is tempted to make another exception. Sooner or later, he will have an accident.

The same can be said of other mining practices. The worker can be taught to be constantly on the lookout for bad roof, kettle bottoms, faulty timbering, accumulations of coal dust, possible face falls, possible hazards around mining machinery, overhanging electric wires, faulty track, open shafts and the hundreds of other possibilities for accidents in a coal mine. Forming the habit of being on the lookout for these hazards is important, but far more important is the knowledge of what to do about them and how to do it. This information can be taught and our experience shows that men are eager to learn.

Safety Rules Usually Ignored

Records of accidents show that the men involved are either ignorant of state laws or company regulations or wilfully careless of these laws and regulations. With adequate instruction, miners would appreciate the dangers associated with such practices as using short fuses, tamping with coal dust, reboring too soon or improperly after a misfire, chocking or spragging coal cars improperly, inspecting roof inadequately, timbering improperly and other bad practices that are likely to cause accidents. The educated miner who has developed proper work habits is a safe worker.

All workers should receive this instruction in the technical aspects of mining. It is not difficult to form classes, provided the instructors are competent coal miners, are good teachers and are thoroughly familiar with coal-mining practices and the technical subject matter. Since April 1947, 46 classes in six counties in Virginia have been conducted with an enrollment of 677 miners. The 225 men who took the Virginia mine foremen's examination passed, almost without exception. In addition, 24 men passed the foremen's examination of a

neighboring state. Over 200 men received instruction in first aid. While giving first-aid instruction is one of the services of the U. S. Bureau of Mines, yet, since this instruction was not then being offered by the Bureau, our instructors gave it to help miners qualify for the mine foreman's certificate.

Varied Subjects Taught

Virginia's program of coal-mining education is divided into 20 units, including: mine arithmetic, mines gases, gas-testing devices, ventilation, timbering, explosives, fires, explosions, drainage, haulage, mine machinery and equipment, accident prevention, map reading, mining methods and foremanship. Classes are held during the hours when men are not at work. The salaries of the instructors are paid by the Virginia Department of Education through the school boards in the counties where the classes are held. Close cooperation is maintained among employees, the unions, the U. S. Bureau of Mines and the mine inspectors of the Virginia Department of Labor and Industry.

When a miner completes a given unit of the course of study, he is given a certificate of completion for that unit. When he has completed all the units in the course of study and has passed a local examination given by the local advisory committee, he is given a diploma issued by the Virginia Board of Education. Those miners who successfully complete the course of study have little or no difficulty in passing the state mining examination. It goes without saying that these educated and trained workers are safe workers, contributing greatly to the excellent safety record enjoyed by the mines in Virginia that are participating in the training program.

Mine safety is not a responsibility of the state Department of Education alone, nor of the coal operators, nor of the U. S. Bureau of Mines, nor of the state Bureau of Mines, nor of the unions. It is the combined responsibility of all these agencies and organizations working cooperatively. To make it work, each agency and organization has to do its part. While the state Department of Education can provide the instruction, the other agencies must provide the technical advice, the encouragement, the guidance, the organization of groups and the scientific and professional atmosphere that must prevail if the program is to succeed.



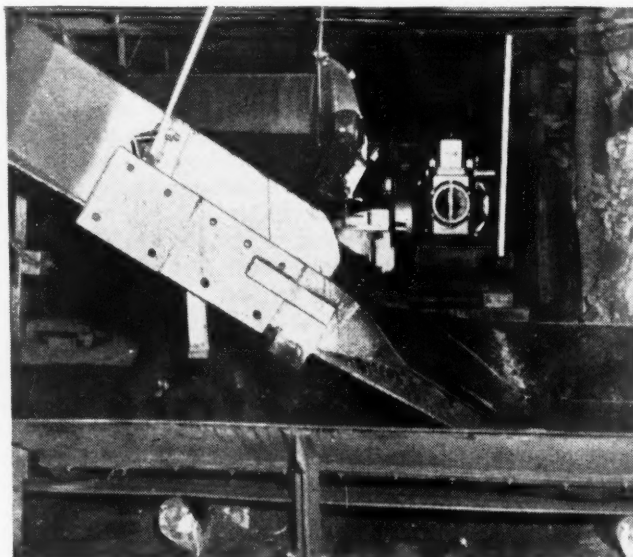
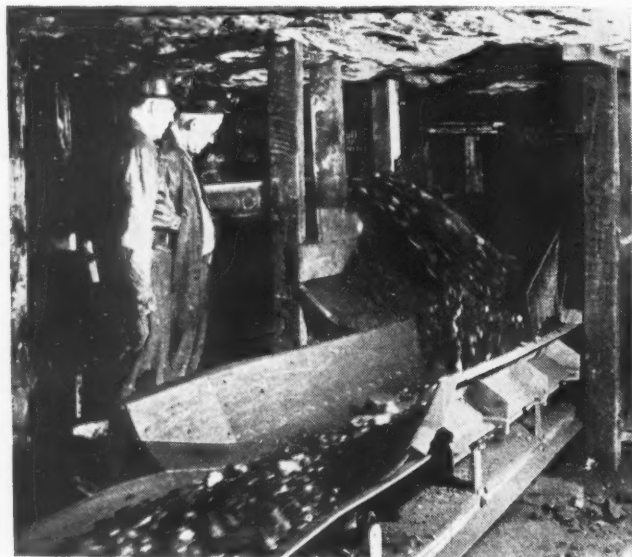
GOOD INSTALLATION a key factor in belt operation. This main-line conveyor was set on cross timbers to conform exactly to a profile made by the engineers.

Belt Selection and Installation

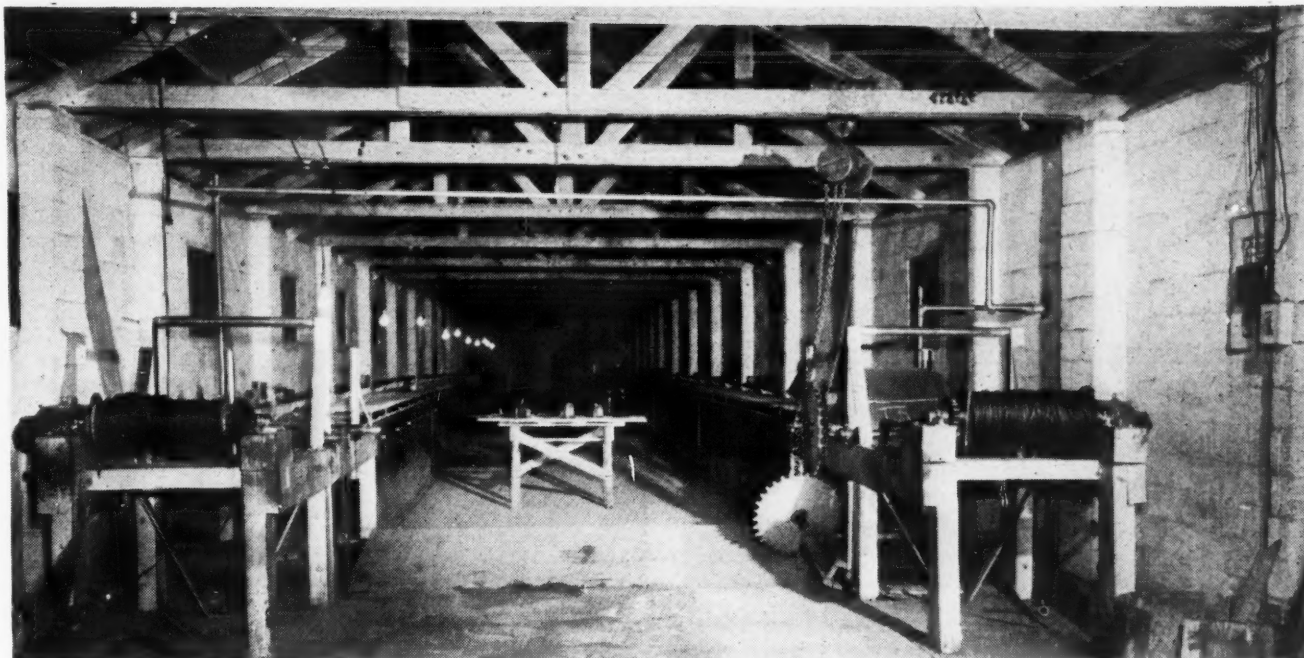
Underground Conveyor Design and Belt Construction for Ease of Handling and Maximum Life—Installation for Efficient Service—Splicing Considerations, Hopper Design and Protection—Belt Maintenance

By J. H. EDWARDS
Associate Editor, Coal Age

BELT TRANSPORTATION underground has come of age and guideposts can now be planted to show the way in selecting, installing, operating and maintaining belt conveyors. Because of the wide range of natural conditions, assorted mining plans, differences in early types of belt conveyors and, in a measure, the ups-and-downs of the coal-mining industry, it has taken 25 years



CHUTE DESIGN should turn coal in the belt direction and provide for passage of lumps. Chute at left is counterbalanced to rise when struck by a lump. Chute at right is raised when coal is not flowing.



GOOD MAINTENANCE is the second key to good belt operation. The drying and repair tables in this special shop are long enough to handle complete sections.

since the initial installation of face and room belts by the Pennsylvania Coal & Coke Co., near Cresson, Pa., to bring about a fair understanding of belt-conveyor problems. Belt conveyors in approximately their present form were first installed for mother or section duty in 1931 by Barnes & Tucker, Cambria County, Pennsylvania.

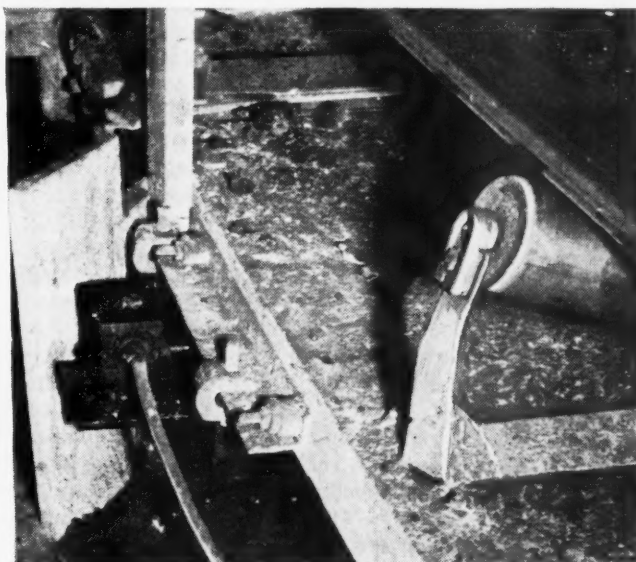
Selection of equipment best suited to the natural conditions and the particular job goes a long way toward economical transportation and good efficiency with belts. For section belts in seams of 40 in. or thicker, it is desirable to select a

type of frame section which comes apart in a small number of component parts, so that there are a minimum number to handle and lose. In very low coal, say 30 to 36 in., where handling materials is difficult, there is considerable advantage in lightweight pieces of small bulk. Therefore, the conveyor section that is lightest and knocks down into the greatest number of component parts usually is the best. The necessity for close timbering may have a bearing on the size of the parts to avoid difficulty in moving sections between posts.

Structure of the frame sections

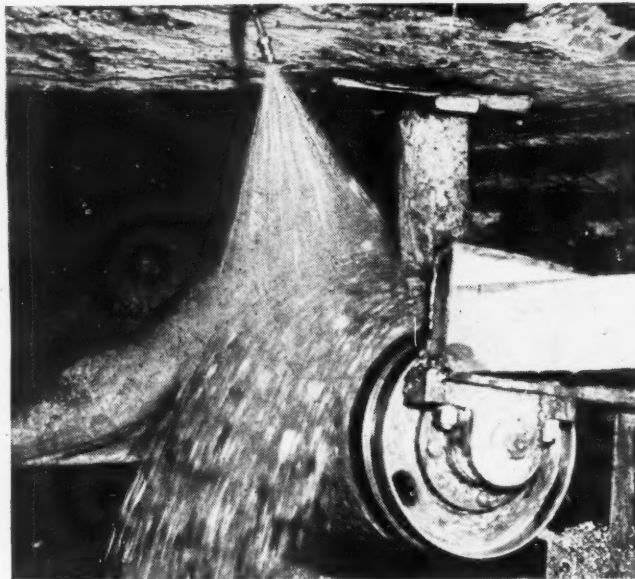
and the method of joining must, of course, be rigid enough to maintain alignment. The several manufacturers who are supplying the bulk of the underground belt conveyors have taken care of this feature in good fashion. Parts heavy enough to resist damage in handling are, as a rule, strong enough to maintain rigidity after assembly into the conveyor.

Horsepower required of the drive will depend on belt width, maximum conveyor length, speed, loading and grades. If the territory is known to have widely varying grades, or if the seam is of uniform pitch and



PROTECTION AGAINST PILE-UPS should be provided by paddle switches (left) or other automatic devices or controls. An additional protective unit is the roller or plugging switch shown at the right.

Belt Success Requires Care in Installation and Maintenance



COMBINING LUBRICATION (left) with cleaning is found helpful in many conveyor mines. Where sprays are used (right), a minimum of water should be employed and be turned off when the belt is empty.

belts are to be used interchangeably on both adverse and favorable grades, then drives should all be high power. As an example, a drive of 40 hp. will ordinarily handle a 30-in. section belt with a maximum length of 2,500 ft. and carrying coal up a 4-percent grade if the tonnage is not excessive. Belts of the same width and length but working on the level or down a 4-percent grade can be powered by 25-hp. motors, although some operators prefer using the same size motor for both favorable and adverse grades. These approximations are for units operating at ordinary speeds of 200 to 250 f.p.m. Faster speeds and heavier loadings will, of course, call for larger motors. One company opening a large new trackless mine has standardized on 60-hp. drives for all belt conveyors in by the long main-line conveyor. Another new mine using 36-in. belt conveyors 1,100 ft. long in panels and operating at 520 f.p.m. uses 40-hp. drives.

Belt width may depend on standardization as well as on load and speed. If 30-in. belts are required for main or mother conveyors, it may pay to use that size instead of 26-in. for panel belts, so that belting no longer good enough for main or mother duty can be switched to use in the panels. With the larger companies there is a move toward standardization on 30-in. belts. Large lumps of coal or rock may call for selection of belts wider than otherwise.

While a.c. motors are used successfully for driving belt conveyors in a number of mines and can be of the multi-speed type, the d.c.

motor has the advantage that it can be fitted with a control providing a wide range of speeds and, in turn, a flexibility that permits experimentation and adaptation to different conditions and methods, as well as slowing the belts temporarily for handling men and supplies and to reduce wear in periods when production from a section is small.

The particular forte of a.c. motors for driving underground belt conveyors is in mines where no trolley locomotives are in use and all face equipment is operated by a.c. power or by batteries, thus eliminating the expense of d.c. substations, trolley wires and bonds.

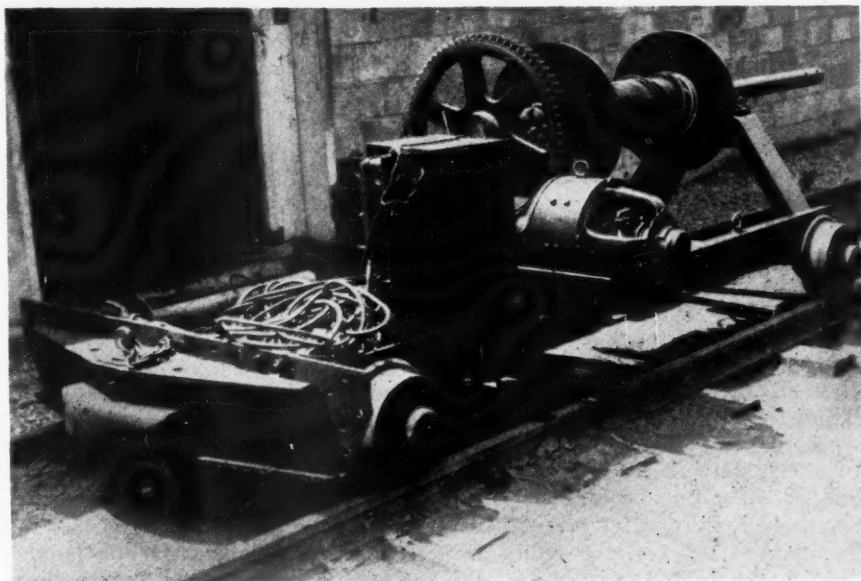
Tail sections having pulleys of the self-cleaning or coal-shedding type are of particular advantage for section conveyors handling wet coal. Accumulations of muck and small pieces of coal damage the belt covering, may break the fabric and pull the belt out of line. The need for special tail pulleys, however, is lessened by cleanliness and good maintenance, which will be discussed later in this article. Some belt conveyor specialists caution that self-shedding pulleys, although helpful in many instances, are not a panacea.

Early conveyors used for panel or mother duty operated with the carrying side flat. Some of these are still in use. Conveyors with troughing idlers have proved far superior and are now supplied by all manufacturers. It should be mentioned here, however, that a recent development is operating the belt flat but on idlers instead of dragging on a plate.

Angle of the troughing idlers is still a matter of some debate and it is known that some conveyors have been troughed too deeply. Width of the belting and loads to be carried have a bearing on this specification. Twenty to 25 deg. is the range covering most conveyors. Most operators who have had experience with both 20- and 25-deg. types prefer the former from the standpoints of better troughing, better loading and less wear near the edges. Apparently the 20-deg. incline for rolls is fast becoming standard. Present recommendations of the well-known builders of belt conveyors for underground work are within the safe limits for satisfactory operation.

Idlers with sealed-for-life anti-friction bearings properly protected inside of rollers afford the immediate advantage of months of operation without attention. When attention ultimately is required, however, it means replacing the bearings. Proponents of idlers with anti-friction bearings that must be lubricated periodically contend that with properly constructed seals the bearings need be lubricated at only 4- to 6-month intervals to assure numerous years of trouble-free service. Because it is good practice to employ men to keep belt lines clean, the cost of periodic lubrication at much shorter intervals can be held to a small figure by having the same men do the greasing.

Spacing of idlers has been satisfactory for some years on practically all makes of underground belt conveyors. Standardization of



BELT WINDERS, such as this unit combined with a winch, speed up moving and decrease the possibility of damage in handling.

frame-section length brought that about. Spacings of 4 ft. for carrying idlers and 8 ft. for return idlers are used with 8-ft. frame sections and spacings of 5 ft. and 10 ft. with sections 10 ft. long.

The question of whether to equip underground conveyors with self-aligning idlers depends on conveyor size and the total tonnage to be handled before the conveyor is moved. It is generally agreed that section or panel conveyors 2,000 to 2,500 ft. in length need not have self-aligning idlers. Whether mother belts need them is debatable. One belt-conveyor engineer who thinks they do contends, however, that they should be on the bottom run rather than on the carrying run. Heavy-duty main-line belts should have self-aligning idlers on both top and bottom.

Belting specifications entail considerations of the maximum length of conveyor, grades over which the conveyor operates, character of the coal, size of lumps and whether the duty includes conveying rock.

Belts with synthetic fibers are available for lengths and loads greater than the usual range, as well as belts with a duck made by combining treated cotton with synthetic fibers, plus belts with steel cords for extra-long runs, lifts or both. Splices in belts for lengths and loads greater than the usual range, and for extra-long runs, lifts or both, must be vulcanized. Use of metal fasteners would provide no advantage over cotton-ply belts.

The number of plies in a can-

vas belt must, of course, depend on the duty. Three-ply construction is the minimum and 4-ply the most common. These generally are considered good for section belts up to 2,500 ft. long if severe adverse grades are not encountered.

Canvas ply can be too heavy and/or the number of plies too great to permit the belt to trough well. A 4-ply 42-oz. canvas belt 26 to 30 in. wide may trough poorly, while a 3-ply 48-oz. cord belt or a 5-ply 28-oz. belt of the same type may work considerably better.

Belt Coverings Important

Even for the easy conditions of soft coal with no large lumps, no rock and no sharp edges on the material, the top covering of the belt should be a least 1/16 in. thick. Coal with sharp edges, large lumps and rock that may have sharp edges and come in large chunks may call for top coverings of 1/8 in. or more. The early mistake of buying belts with pulley-side coverings but 1/32 in. thick has been rectified in favor of minimum coverings of 1/16 in. There is a trend toward minimum top coverings of 1/8 in.

Assuming that reasonable study and care have been exercised in the selection of equipment to meet the natural conditions that are known or expected and to suit the production methods to be employed, proper installation becomes the next very important problem. Usually mining men with the longest experience with underground belts go the farthest in

emphasizing the importance of doing the best possible job of installation.

Close to perfect alignment of the structure is most essential, and the first important job is lining and leveling the head end. Spads should be set in the roof for the entire length of the conveyor and a string stretched between them, from which a plumb bob can be dropped for establishing alignment. With the spads 20 ft. apart it is relatively easy to line the frames properly. Skilled crews can do a good job even if the spads are spaced 80 to 100 ft.

It is advisable to train and instruct men to get the alignment of frames "exactly" correct and call them to account if the maximum misalignment is found to exceed 1/16 in. Particular care should be taken to see that all boom, drive, tail and snub pulleys are square with the longitudinal supporting members of the conveyor.

Frames must be installed level and the footing arranged so there will be no settlement—or at least no uneven settlement that will leave one side higher than the other. Return idlers should clear the mine bottom by 4 to 5 in., so that dirt knocked off by them will not require too frequent removal to forestall piling up to the point of fouling the idler and wearing against the belt.

A satisfactory belt installation is much like a good track installation. To begin with there must be a good alignment and a good foundation. One difference is that the belt conveyor obviates the necessity for grading. Usually, the conveyor can be installed on the seam bottom through local rolls and dips. Belt tension, governed largely by length and average grade, is a factor which may require easing of vertical curves. With belts, the roof supporting posts can be placed close to the center of the entry where, as a rule, the support is most needed.

Getting idlers square with the frame is very important. Conveyors accurately made and with holes accurately positioned in frames and idler supports leave no room for error. On the other hand, they provide no adjustment if there is a miscue. If the structure or idler support has a slot for adjustment, the parts should have plain markings or other means of indicating the square setting. Setting the idlers by using a carpenter's square lined with the side of the frame can usually be done with sufficient accuracy, but the most accurate

Attention to Details the Secret of Efficient Belt Operation

check of idler squareness is stretching a steel wire 50 ft. or so parallel to the side of the assembled frame and squaring from that. In wide contrast, it has been demonstrated that two experienced men with "good eyes" and carrying heavy hammers have cured belt-training difficulties by walking on opposite sides along a conveyor and tapping the idler supports to square them up.

Installing New Belts

The carcass of a new belt can be damaged or broken by careless handling during transportation and installation. If it is unrolled and accordion folded, the ends of the loops should not be placed one above the other. This avoids building up weight that might bend the belt too sharply. Where roof height permits, it will pay to install a track- or rubber-mounted belt-winding machine for handling belt sections that can be accommodated.

When starting a new conveyor or a new belt on an old conveyor it may happen that it will not train properly at no load but will perform perfectly when loaded. The stiffness of the new belt may be the cause. To train properly a belt must bear down on the center roller. Edge wear is severe on a stiff new belt, but can be reduced if the supports of the troughing idlers are tipped temporarily 1 to 2 deg. out of vertical in the direction of belt travel. Idler supports 4 in. wide will require shims along one side about $\frac{1}{8}$ in. thick and supports 6 in. wide will require 3/16-in. shims.

To install conveyors properly with minimum labor cost and without excessive supervision, the workmen should have special training. Therein lies the advantage for the mine of sufficient size so that a specially trained crew can be kept busy at the belt-installation job. It's the old story—specialization to increase efficiency. Before a new conveyor is put into operation it is important that all bearings not of the sealed-for-life type be properly lubricated. Too often that obvious precaution is neglected and damage results.

Good maintenance completes the triangle of belt-conveyor satisfaction. Belts are far from foolproof, as indicated by numerous instances of tremendous damage in a short time as a result of some seemingly small error or maintenance defect.

Tension and splicing problems are somewhat related both to each other and to training qualities. Square-

ness of splices affects alignment and the type of splicing has a bearing on the tension that can be used. Depending on vertical guide idlers to keep a belt in line is poor practice. Wear on the edge of the belt exposes the plies to moisture and then abrasion is accelerated. Obviously, the alternative to vertical guide rollers is proper training of the belt in the first place and then making sure that training is not disturbed. Use of a few vertical guide idlers set well back from the edge of the belt as a safety measure is not to be criticized.

Getting the two ends square or, in effect, getting the two pieces of belting in proper alignment is a necessity for properly trained belts. To make a square cut ready for hinged or bolted fasteners, the mark should be made with a square having a leg about 6 ft. long to lay against the edge of the belt. If the sides are frayed or have been repaired unevenly, it may be necessary to square from a center line determined by measuring and marking along 20 to 30 ft. of the belting.

Splicing Methods Vary

Hinged splices held by teeth driven into the belt and using flexible metal pins are convenient for adding sections of belting and are satisfactory for belt conveyors of normal lengths—but only if applied in the best possible manner. In most cases, this means applied only in an outside shop. A ground-point fastener that has been widely used in European mines and is said to provide 20-percent greater strength is now being introduced into American operations. With the special tool supplied for splicing, a good job should be possible in almost any location.

Bolted-fastener splices are capable of handling belts of greater length than the conventional hinged fasteners. Cutting ends cleanly and squarely and without injury to the workmen is facilitated by using a commercial-type belt cutter which includes a guide fastened temporarily to the belt. After the cuts are made and before the splicer is applied, the ends of the belt should be coated with red electrical paint to prevent the entrance of moisture.

To train properly, belts operating through swags must be loose enough to stay down on the idlers. Tension should not be greater than necessary. The reversing of belts, which requires higher tension and better training qualities, is losing favor. If idlers have been shifted out of

square to train a belt, they will react to throw the belt out of line if the operation is reversed. Under some conditions of low coal and bad top, reversal to carry men and supplies is, however, worth the extra care and maintenance that may be involved. Supply tracks, or battery-operated tractors and trailers if the bottom is favorable, usually are a good investment.

To solve the problem of sufficient battery capacity for rubber-tired tractors and trailers for carrying men and supplies long distances, a double-trolley arrangement is to be installed in at least two mines in the near future. The rubber-tired tractors will carry motor-generators to change 250 volts d.c. to 48 volts d.c. to operate the tractor motors directly and at the same time, charge the tractor batteries for off-trolley operation in the sections.

Man-Riding Debatable

Wide differences of opinions and practices exist relative to carrying men on belts. Many companies permit it but some have ruled against it for all their mines. While low coal makes the practice seem a necessity, it may involve danger to the men at low spots and under headers. Getting on and off requires dexterity and know-how in low coal. For carrying men where such conditions prevail, speeds should be reduced to 100 f.p.m. and electric eyes or other positive devices should be installed to stop the belt automatically if a man fails to unload. Another safeguard, which is a requirement in Pennsylvania, is an emergency cord stretched over the entire length of the belt so a man riding on it can stop it at any time. In high coal it is not unusual for men to get on and off of belts without stopping, even though the belts are operated at speeds of 250 to 400 f.p.m.

Higher-speed operation has the advantages of easier training and a lower tension, which puts less strain on the weakest point: the splice. The disadvantages are a higher power demand, extra wear on the mechanical parts and added abrasion at the loading point.

Normal speeds in general practice range from 200 to 500 f.p.m. Recognizing the need for carrying coal away at a fast clip while a shuttle car is dumping directly to a belt, but mindful of the higher maintenance and power disadvantages of running belts at high speed, at least one company has fitted panel and mother belts with controls raising

panel-belt speed from 220 to 440 f.p.m. while the shuttle car is discharging and also speeding up the mother belt while coal is being transferred onto it by the panel belt (*Coal Age*, July, 1948).

Means should be provided for quickly cutting power off the drive in case of belt slippage, overload or clogging at loading or transfer points where chunks of coal or rock might cut, rip or severely wear the belt. Overload relays should be adjusted to the lowest practical setting. Plugging or other centrifugal-type switches should be installed to operate directly in contact with the belt. Paddle switches, actuated by undue piling up of coal or rock, should be provided at transfer points. Even if a man is kept stationed at the transfer point to dispatch rock and coal and to stop belts in case of clogging, the automatic paddle switch is worthwhile insurance.

Hoppers and chutes properly designed for centering the coal on the belt are a necessity for correct training. Flow forces that tend to place coal off center can be completely counteracted by hopper sides and chute shapes properly offset from the center.

Lowered Chutes Cut Abrasion

To minimize belt abrasion the nose of a transfer chute should be down close to the belt and should have a pitch that will speed up the coal to match the speed of the belt. It helps in most cases to have a grizzly at the end of the chute to put the fines on the belt first to cushion the lumps. Rubber-covered or pneumatic idlers at the loading point reduce impact and, generally speaking, are justified on high-tonnage main-line conveyors.

Belts by all means should be kept clean and out of water. A wet belt cuts much easier than a dry one and is very likely to slip on the drive pulley. Abrasions that are not readily detected with the naked eye may permit entrance of moisture and cause weakening of the fabric. Dirt and water form a combination that promotes stuck rollers and they, in turn, increase load and tension and pull the belt out of line. Good housekeeping is highly important along belts. This means employing men whose first duty is cleaning. In addition to keeping the floor and all parts free of coal spillage, they should keep leakage grease wiped up. Cleaning and lubricating duties can often be combined to good advantage.

It has been proposed that a wattmeter be installed at each drive to indicate the power being used. Increased demand would indicate stuck rollers or some other irregularity.

Mention of keeping belts out of water brings up the question of sprays at the transfer points. Safety comes first and water sprays should be used if the coal is at all dusty. It is important, however, that a very fine mist be used so that a minimum of water will trap the dust. Manual or automatic controls should turn the mist on and off so that empty belts will not be sprayed.

Train New Belt Properly

When installing a complete new belt on a conveyor or adding a section of new belting, it is important to get the new belting trained correctly at the beginning. Otherwise it may be stretched out of shape, making it impossible to train correctly thereafter.

A tremendous sum of money is tied up in belting, and the depreciation is dependent to a great extent on the facilities and methods established for making repairs as soon as practicable after damage or wear becomes apparent and for doing the repair job in a thorough manner. Recovering worn spots of the surfaces, rebuilding worn edges and early repair of torn places can double the life of a belt and, in some cases, save communicated damage to good pieces of belting operating on the same conveyor.

Some operators are of the opinion that the use of 10,000 ft. or so of belting justifies construction of a belt-repair building or room in which belts can be stretched out for heat drying and where there are benches 100 to 300 ft. long for repairing. These operators further state that a company operating several mines equipped with belts will do well to establish a central belt shop where expert help can be employed. Another school of thought maintains that belts should be given all possible attention in installation, operation, inspection and immediate minor repairs underground and then replaced when major repairs otherwise would become necessary.

The belt shop should, if practicable, have work benches or tables half as long as the greatest lengths of belting used and should include power-winch facilities for pulling the belting along on rollers under the bench desk and dragging it on

around on the top. With the benches inclosed and heating units underneath, perhaps combined with small blowers to promote circulation, half the belt can be dried at one time. Then, while this half is being repaired on the top, the other half can be dried underneath. Too much emphasis cannot be placed on thorough drying.

Two heated benches or tables, each 150-ft. long and equipped with power winches, are used in the central belt-repair shop of a company operating five belt-equipped mines in southern West Virginia and eastern Kentucky (*Coal Age*, September, 1947). The room, which accommodates the two benches and provides storage space for belts and materials, is 28x194 ft.

Even in mining company belt-repair shops, heat vulcanizing is little used because of the expensive equipment that would be required for rapid treating of long tears, raw edges and large patches. Self-curing rubber doughs and cements are employed and result in reasonably good jobs, although less satisfactory than heat vulcanizing.

Fire Protection Essential

Experience has demonstrated that belts can catch fire in the mines, that the fire can travel rapidly along the belt, and that the heat from such a fire can be great enough to cause extensive falls of roof onto the belt. Therefore, even though the previously mentioned rules of good housekeeping and protective apparatus are followed, fire-extinguishing equipment should be installed.

If water lines are available, connections should be installed at intervals convenient for the hose lengths kept on the section. Hand-type chemical or carbon-dioxide extinguishers should be kept at the drive heads, and these should be supplemented by a generous supply of rock dust. How many other extinguisher and rock-dust stations should be maintained along the conveyor is dependent on length and the difficulty of travel; that is, seam thickness. Reports are current that fire-resistant rubber belting soon will be available.

In presenting the conclusions and recommendations included in this article, *Coal Age* and the author gratefully acknowledge the real help supplied by numerous coal-mining executives, officials, engineers and maintenance men, and the sales and engineering representatives of conveyor and belting manufacturers.



PORTAL IN OLD STRIP PIT at Penowa (left), with discharge end of mother belt at the right.

Island Mining With Shakers

Duckbills and Mother Belts Complete Extraction of Islands Left in Stripping — Three-Man Crews, in 48-In. Seam, Average Three to Four Cuts of Coal and Three to Four Falls of Slate per Shift in Entries

ONE OF A GROWING number of stripping companies to supplement open-pit operation with deep mining of "islands" where the overburden is too thick to strip is the Penowa Coal Co., operating near Follansbee,

W. Va. The organization's Deep Mine No. 1 is projected to produce 1,500 tons per two-shift day using shaker conveyors, duckbills and mother belts to trucks on the outside for the final haul to the prep-

aration plant about two miles away.

Penowa made a thorough study to determine the most economical method of recovering Pittsburgh-seam coal left in the "islands" resulting when overburden thickness increased to over 65 ft. As a result of this study, it was decided to drive entries across the islands and mine rooms with duckbills and mother belts. Each entry in the island now being worked consists of three headings 12 ft. wide on 62-ft. centers. The distance across the island averages about 1,800 ft.

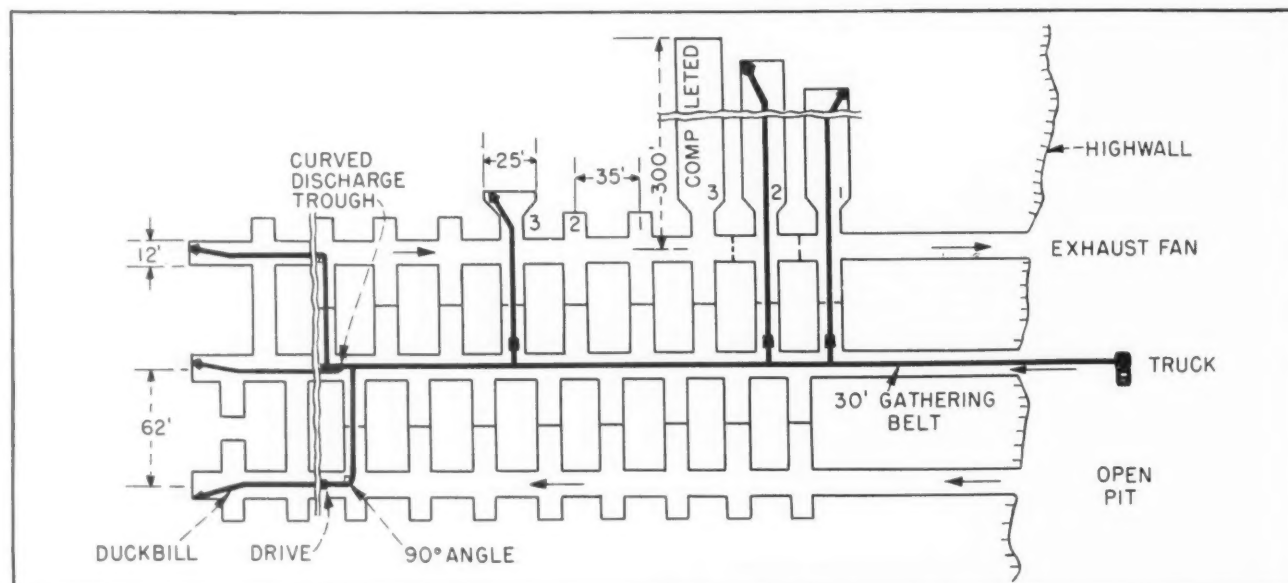
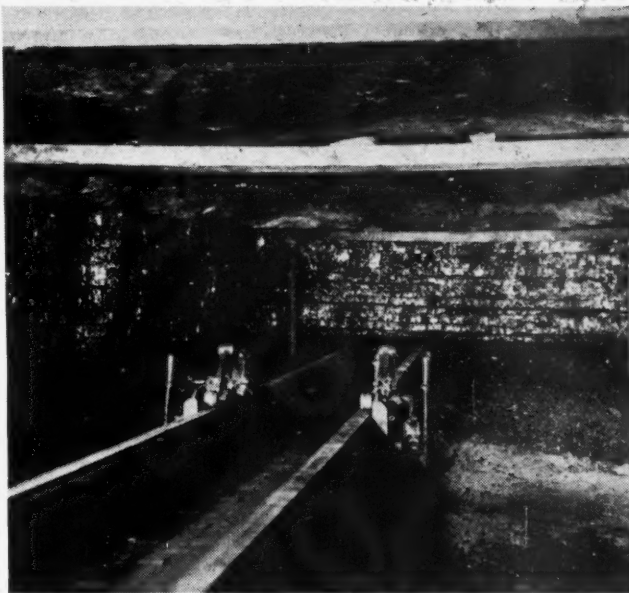
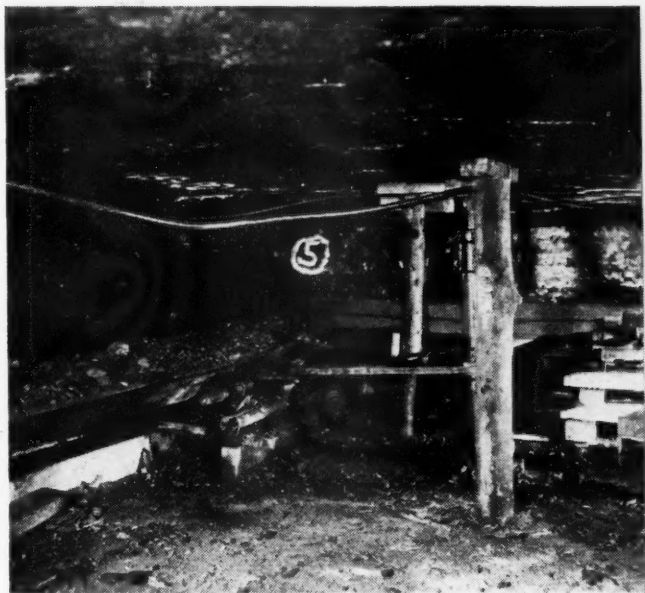


FIG. 1—ENTRY DEVELOPMENT AND ROOM-MINING PLAN in Penowa island-mining program.



UNDERGROUND OPERATION with 90-deg.-angle drive at the left and working face with duckbill at the right.

As the entry advances, rooms are necked on 35-ft. centers on each side (Fig. 1).

The three duckbills in the headings discharge directly to the belt conveyor, which is placed in the center heading. The conveyors in the outside headings discharge over the sides of the belt by means of 90-deg.-angle troughs back of the drives. The shaker in the middle opening is set slightly off center so that it can parallel the belt conveyor for 10 or 12 ft. at the discharge end. A curved discharge trough puts the coal on the belt over the side. This permits the tail end of the belt conveyor to be moved and the belt to be extended 300 ft. toward the face without disturbing the shaker. Thus, when the shaker drives are moved ahead, the belt conveyor already is extended and ready for operation.

The rooms on the right are worked on the advance and those on the left, which are necked on the advance, on the retreat after the entry has been driven to its limit. The rooms are worked in groups of three. Each inby duckbill is kept four or five cuts ahead of the next outby duckbill. This permits moving a duckbill three rooms ahead when the inby room is finished without interference with the other two working units. Also, it is not necessary to move all three units at one time. On the retreat, the outby conveyors are kept in advance of the inby unit.

After the first entry has been driven through, another will be started in the highwall 724 ft. away (centers distance). Then the same

procedure of driving headings and working rooms will be repeated.

Penowa Deep Mine No. 1 opens up an island of 48-in.-thick Pittsburgh-seam coal containing approximately 3,000,000 tons. The overburden varies from approximately 65 to 150 ft. Each entry set-up will recover from 70,000 to 80,000 tons of coal.

Drawslate over the coal varies from 0 to 24 in. in thickness. This slate is being taken down in headings but, by the use of shaker conveyors and duckbills, can be held in place in the rooms. Heading slate is being gobbled in room necks and crosscuts and will be loaded out on off-days when conveyors and trucks outside are not handling coal.

To equip for its deep-mining program, Penowa has installed or has placed orders for the following: 12 Goodman Type 512 shortwalls with bugdusters, 12 Type G15B74 shaker conveyors using Size 1½ troughing, Type EL-½G duckbills and four 1,800-ft. Type 97-HC-30 belt conveyors.

Bugdusters on the shortwalls permit a reduction in face labor so that three to four cuts of coal and three to four falls of slate can be handled by the three men in each heading per shift with the duckbills. The belt conveyors are easily extended or shortened as required. Low maintenance and operating charges make the belts the cheapest form of transportation for these conditions. The entry portals in the highwall are concrete protected. Ventilation is supplied by a 4-ft. propeller-type exhaust fan driven by a 10-hp. motor.

This method of recovering island coal results in a total mine cost no more than the usual panel cost. Its big advantage is simplicity in getting into the coal and getting it out quickly with a minimum of roof maintenance. Pumping and ventilation also are reduced to a minimum and gathering and intermediate haulage are entirely eliminated.

When breaking into the highwall, the shaker conveyors are set on mud sills in the open pit until each heading has been driven 50 ft. in past the first crosscuts. During this breaking-in period, a shaker conveyor is set across the ends of the heading shakers to receive the coal and elevate it to truck height. When the shaker drives are moved inside, the belt conveyor is installed in the center heading as previously described.

Power for deep operation was being supplied at the time this article was prepared by two 100-kw. diesel-electric generators. Only one generator is required for the three units now in operation. Two additional duplicate units will be installed as necessary.

Two army-surplus steel trailers are used for the office and lamp-house. A 20x48-ft. Quonset hut houses the power plant and repair shop. Throwaway bits are used on the cutting machines to eliminate sharpening.

The belt conveyor emerging from the center heading is elevated on the outside to truck-loading height. It feeds directly into 10-ton trucks, which haul the coal about two miles to the preparation plant.



PORTABLE SCREENING AND LOADING PLANT serving the Drawdy mine photographed from the head pulley of the lump loading conveyor or boom. Undersize is loaded by the second conveyor down the track.

Efficient Truck Mine

With Hand Loading Onto Chain Units and Conveyor Transportation, Drawdy Truck Mine Averages 9.6 Tons per Employee in 42-in. Coal — Portable Rubber-Tired Screening - Loading Plant Supplements Lump Storage

By J. H. EDWARDS, Associate Editor, Coal Age

WITH BELTS AND CHAIN CONVEYORS underground and a portable rubber-tired screening-and-loading plant at the railroad siding, the Cedar Grove Mining Co. is averaging 9.6 tons per man-shift, hand loading, at its 480-tons-per-day Drawdy truck mine, in Boone County, W. Va. The chain convey-



ENTRY CONVEYOR discharging to the first section of the main conveyor. The latter is installed in a room.



MAIN CHAIN CONVEYOR discharging to end of belt conveyor. The chain was laid over the top of a heavy fall.

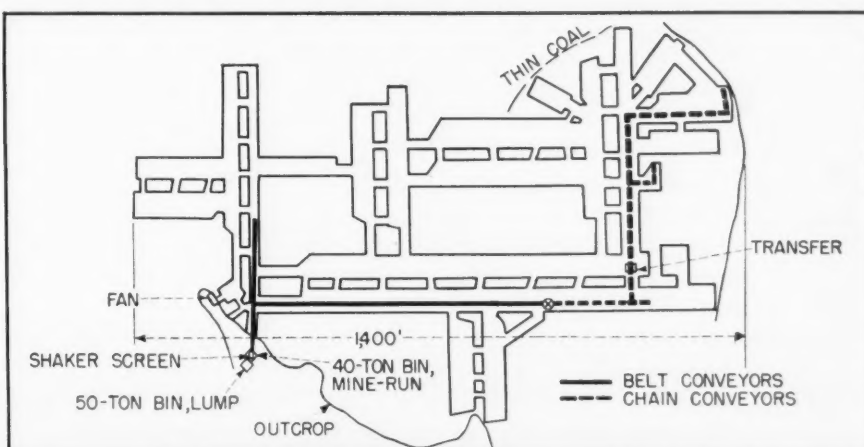


WIDENING A NEW ROOM in Drawdy mine. The face conveyor at left will be installed when the room reaches a width of 25 ft. One row of posts is set per cut, with individual posts on 5-ft. centers.

ors incorporate several new features, while the rubber-tired screen-and-loading plant is one of the first commercial units of that type put into use by the coal industry.

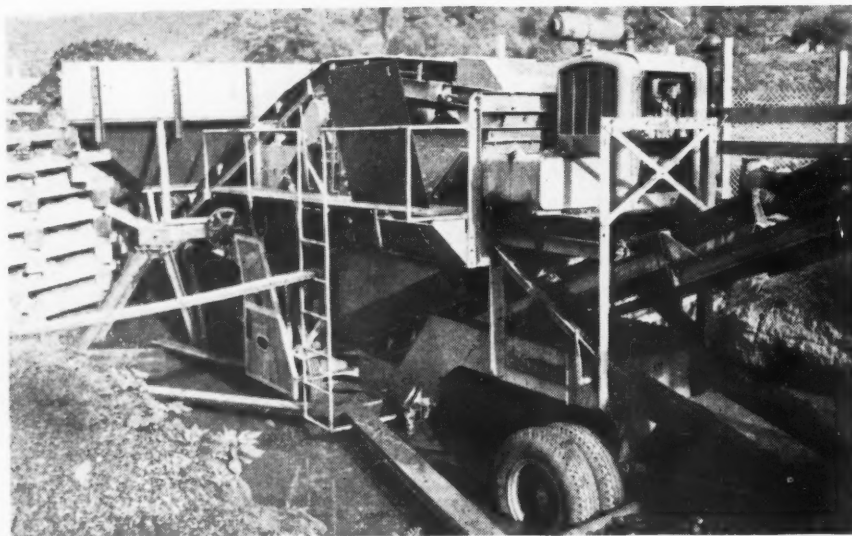
Drawdy mine is a drift operation in the Cedar Grove seam and the portal is 90 ft. higher than the adjacent paved highway. For the most part, the working area is in the upper bench, which averages 42 in. and is free of partings. Several

DRAWDY-MINE DEVELOPMENT, showing room work and conveyor haulage system.

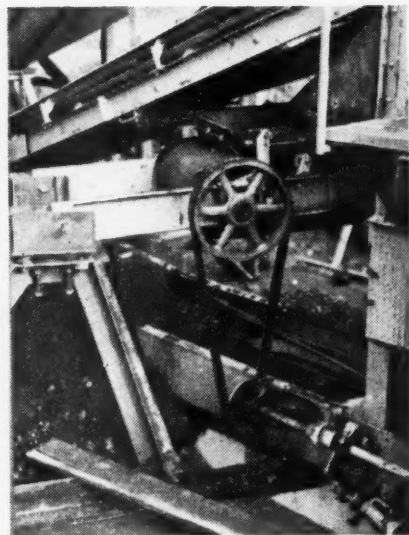


TWO MEN EXTEND A ROOM CONVEYOR while others cut and drill. The six men comprising the crew do all the preparation, loading, conveyor moving and extending. Extra-strong flights and four-link chain sections are conveyor features.

Portable Tipple Handles Drawdy-Mine Output



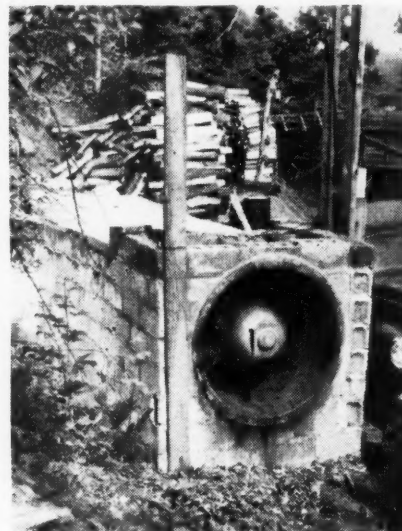
CLOSE-UP OF PORTABLE TIPPLE after a drenching rain had put a foot of water in the pit. Power is provided by the diesel engine (upper right).



PULLEYS FOR THE V-BELT drive for the lump conveyor are 30 deg. off parallel.



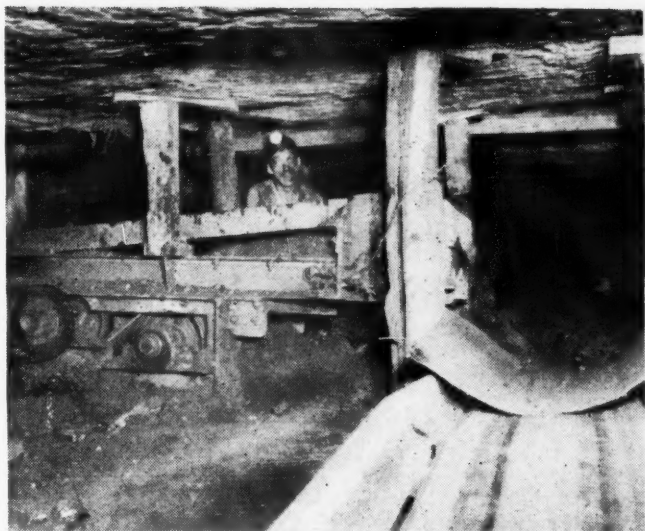
TRENCH FOR TIPPLE permits use of 4-ft. dirt fill for truck ramp rather than the expensive wooden trestle that would be necessary to stand the truck traffic.



MINE VENTILATION is provided by this 42-in. war-surplus fan circulating 42,000 c.f.m.



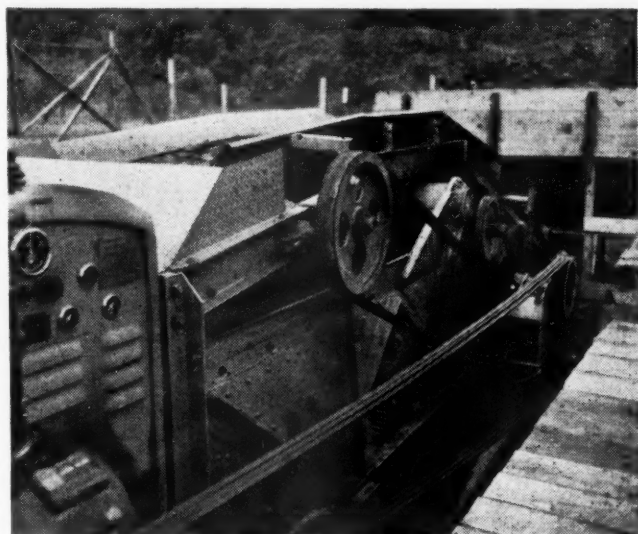
PULLING THE PORTABLE TIPPLE to its working site with a tractor. The tipple includes hopper, elevating belt and screen.



THE 625-FT. MAIN BELT at the left discharges to a shorter belt leading to the outside. Both belts are 20-in. flat units.



LOUIS SCOLISH, part owner, beside the main belt, which discharges to a shaker screen over the truck-loading bins.



V-BELTS CONSTITUTE THE DRIVES from the engine to the counter-shaft and to the screen and conveyors.



E. F. WOOD (left), mine foreman, with Norman Johnson, part owner, in a working room in Drawdy truck mine.

local rolls are encountered. These result in grades too steep for track-and-locomotive transportation and in thinning of the coal in some places to as low as 28 in. In one section, the two benches (lower 30 to 39 in. thick) came together and there both were mined. The top over the upper bench is a strong slate and the bottom normally is a hard slate. Coal quality is high and the mine product is in demand in the steam, domestic, gas-coal and general-industrial markets. A channel sample from the upper bench showed 2.23 percent ash.

Owners of the company are Norman Johnson, Riverview, W. Va., and Louis Scolish, Charleston, both formerly of the Ward (W. Va.) division of the Kelley's Creek Colliery Co., where Mr. Johnson was mining engineer and Mr. Scolish mine foreman. They opened Draw-

dy mine in September, 1947. Their lease comprises 324 acres and includes several seams. The No. 2 Gas lies 80 ft. below the Cedar Grove and outcrops at about highway elevation at the point where the truck road enters the property.

As the accompanying map indicates, both the mine layout and the conveyor arrangement are unusual. Local rolls and seam conditions caused modifications after the mine was opened. Only a short belt conveyor is now in use on what was projected as the main. It receives coal from another belt conveyor 625 ft. long in a room 50 ft. wide. The fact that this belt conveyor is not extended the full length of the haul in that room and a chain conveyor is used part way is explained by the occurrence of a huge fall. Instead of cleaning up the fall, the belt was terminated there and a chain con-

veyor installed over the top. This arrangement saved the substantial cost that otherwise would have been involved in cleaning a beltway through the fall.

The map shows a transfer point on the cross entry turned to the left from the haulage room. This results from the fact that a local dip with grades too steep for the vertical-curving limits of a chain conveyor occurred immediately in by the point where the entry joins the room. To avoid rock work, an 80-ft. chain conveyor was installed as an elevator.

Rooms are driven 50 ft. wide and two are worked. Equipment for each room consists of the chain room conveyor, a 35-ft. chain face conveyor, shortwall cutting machine and hand-held electric coal drill. Six men make up a face crew and they do all the preparing, load-

ing and conveyor moving and extending. After one-third of the face is undercut it is shot and then loaded while the other two-thirds is cut and prepared.

Six to seven holes are drilled in a 50-ft. room and normal charging per hole consists of two sticks of 1¼-in. Atlas Coalite B. Holes are loaded in groups but are shot separately. Coal loading is done on two shifts and the handling of supplies on the third. To move supplies, the belts are reversed but the chains are not. Workmen pull small four-wheeled rubber-tired carts to carry the materials from the end of the belt to the faces.

The shortwall cutters are Goodman 12AA units equipped with 7-ft. bars and using plain blacksmith-sharpened bits. Throwaway bits were used for a time but were discarded because of breakage. Three electric coal drills are on the job. Two are Chicago Pneumatic No. 472 and the other a Jeffrey A7.

Chain Conveyors Standard

Drawdy mine has standardized on Long 400-R chain conveyors made by the Long Super Mine Car Co., Fayetteville, W. Va. Face units are driven by 5-hp. motors; others by 10-hp. motors. Messrs. Johnson and Scolish favor the Long conveyors because of (1) strength and simplicity of flights and chains, (2) construction of the drive head, which puts the slack of the chain in the right place and dislodges lumps from under the chain, (3) the light-weight open-end tail piece, which has shoulders on the sprocket to reduce wear on the chains, and (4) the male and female pan connections, which keep butt joints in proper alignment. They especially like the construction of the flights which, in service in the Drawdy mine, have proved much stronger. Assembly difficulties are eliminated, the management finds, because the chain is in sections of four links each. A unit of four plain links goes between flight units of four links each. All pins are heat treated and the cotters of pins joining the four-link units are hardened.

Belt conveyors are the old-type Goodman 95A in 5-ft. sections, one flat roller per section. Belting 20 in. wide is used. It includes a lower cover of wear-resistant fabric along the edges where, when loaded, the belting tends to drag on the flanges of the side frames. This type of conveyor is used because, upon opening the mine, a reconditioned conveyor of this type was imme-

diately available. The short belt conveying to the outside runs at 250 f.p.m. while the longer belt operates at 200. Both have 10-hp. drives.

Since the change in mining plan required installing the belt in a 50-ft.-wide room, it is protected by 4x4-ft. cribs. In the production rooms, one row of posts is set per cut with the individual posts on 5-ft. centers.

The mine is ventilated at a rate of 42,000 c.f.m. by a 42-in. axial-flow fan built for ship ventilation and purchased as war surplus. It is driven by a 14½-hp. d.c. motor. Power for the mine is purchased and the conversion is handled by one General Electric 100-kw. rotary unit. Cap-lamp equipment consists of 50 Edison lamps.

Two railroad shipping points, both owned by the Cedar Grove company, are available to the mine. One, equipped with the portable tippie and loading two grades, is at Rock Creek on the Little Coal River division of the Chesapeake & Ohio Ry. The truck haul to it is seven miles by state highway. The other shipping point, loading only mine-run, is five miles in the opposite direction on that road, at Peytona.

A two-way separation into 3-in. lump and minus 3-in. resultant can be made at both the portable tippie and at the truck-loading bins at the mine portal. There is no storage at the portable tippie but a 50-ton bin at the mine normally is kept full of 3-in. lump so that it can be drawn upon to fill out any lump cars. During car-shortage periods, this complete filling of cars each day is highly important.

Screening at the mine is done by a motor-driven 4x6-ft. shaker fitted with stepped plate with 3-in. square openings. This shaker receives the coal directly from the mine conveyor, and is mounted over a 40-ton bin. After the 50-ton bin is filled with lump, the screen plate is lifted out of the shaker so that the run-of-mine goes directly down into the 40-ton bin.

The rubber-tired portable screening and loading plant was put into use at Rock Creek May 1, 1948. It is a "Cedar Rapids" plant made by the Iowa Mfg. Co., Cedar Rapids, Iowa, and sold and serviced by the Persinger Supply Co., Charleston, W. Va. As shipped on a railroad flat car with tires on and completely assembled except for the diesel engine and belt extension, the unit was 44 ft. long, 8 ft. wide and 14 ft. high, and weighed 21 tons.

The portable preparation plant,

as furnished by the manufacturer, consists of a small hopper, reciprocating feeder, elevating belt, mechanically vibrated screen and a belt for elevating and loading the undersize. The mining company added a 10-ton hopper into which the trucks dump, extended the undersize belt to 55-ft. centers and added another belt on 130-ft. centers. Both belts are 36 in. wide. The 55-ft. belt elevates the minus-3-in. coal or run-of-mine, as the case may be, while the 130-ft. unit conveys the 3-in. lump to another loading point on the same track. The screen came equipped with two decks but the upper deck was taken out and a part of the lower deck screen blanked off to make it easier to lift out a plate when changing to run-of-mine.

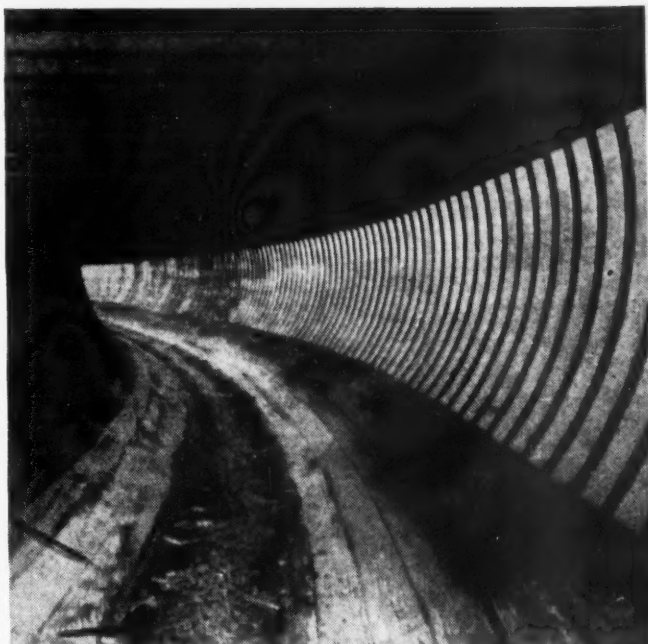
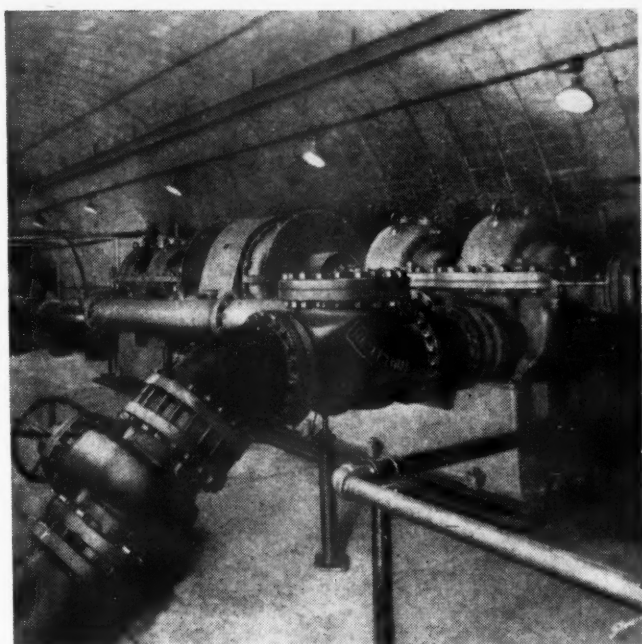
Trench Simplifies Truck Ramp

Instead of installing the portable plant with the tires at ground level and building a wooden trestle for elevating the coal trucks for dumping, a trench 6 ft. deep was dug with a bulldozer and the portable tippie run down into it and parked in the bottom. Wooden cribbing was built adjacent to the top of the hopper and a 4-ft. dirt fill made for the truck approach. This parking of the tippie below ground level is considered much cheaper than construction of a wooden approach trestle, which would have to be massive to withstand for long the bumping of trucks at the dump.

At present, the portable plant is handling coal at the rate of 180 t.p.h. However, the owners think it would handle at least 200 t.p.h. if the feeder were speeded up by adjustment of the stroke mechanism.

The tippie is driven by a two-cylinder Model PTA-2109 General Motors diesel engine equipped with electric starter. Drive connections from engine to jackshaft, vibrator and conveyors are V-belts. Both belt conveyors are driven by their tail pulleys. Since the one carrying the lump takes off at 60 deg. from the side of the tippie, there was a drive connection problem to be solved locally. It was decided that V-belts would probably operate satisfactorily with their pulleys twisted 30 deg. from parallel and so far that arrangement has proved out.

Only one loading track is available to the portable plant at present but application for a second track has been filed. All of the coal trucking from the mine to the railroads is contracted and is being done with Ford 10-ton trucks.



EXAMPLES OF ANTHRACITE WATER-HANDLING EQUIPMENT—Jermyn pump room (left) and 90-in. 100,000-g.p.m. wood-stave flume.

The Anthracite Water Problem

Shortened Industry Life and Curtailment of Production Threatened by Growing Water Problem as a Result of Mining Operations and Property Abandonment—What Is and What Should Be Done to Reach a Solution

By H. H. OTTO, J. T. GRIFFITHS and W. E. THOMPSON

The Hudson Coal Co., Scranton, Pa.

THE PASSING OF THE YEARS has seen the water problem in the anthracite region of Pennsylvania increase to such proportions that it is the chief factor threatening to shorten the life of the industry—and, pending that end, to curtail present production. The region comprises some 484 square miles of coal area in eight counties in the northeastern part of the state and, for identification, is divided into four major fields: Northern, Eastern Middle, Western Middle and Southern. The coal is deposited in long canoe-shaped basins with generally steeply sloping sides and containing many superimposed seams of varying thicknesses, continuity and pitch.

Abstract of a paper presented at the 1948 meeting of the West Virginia Coal Mining Institute by Cadwallader Evans Jr., president, The Hudson Coal Co.

The northern field, with which the authors are most familiar, extends from Forest City to Shickshinny, a distance of 55 miles. The widest part is at Wilkes-Barre, where the distance across the basin is about seven miles. There are 18 workable beds in this field, with as many as 13 present at one location. The greatest depth of basin is at Nanticoke, where the lowest workable bed is about 2,000 ft. below the surface. The coal seams lie comparatively flat, although, in some areas, the sides of the basins dip 15 to 45 deg. The Lackawanna and the North Branch of the Susquehanna River are the principal streams.

The eastern middle field, or Hazleton region, consists of a number of more or less parallel basins, the largest of which is about 15 miles long and 1½ miles across at its widest point. The seams lie

from flat to 60 deg. pitching and are located in much higher ground than the remainder of the anthracite region.

The western middle and southern fields are, like the northern, long and comparatively wide, but the coal lies on extremely steep pitches up to vertical. And, along miles of the southern field, we have what is known as the Sharp Mountain inverted dip. The maximum depth of the southern field has not been ascertained, but is known to be in excess of 2,500 ft.

It is easy to realize from this brief description that mining problems vary widely among the fields. However, one problem common to all is that of keeping water out of the mines—and pumping it when it gets in.

The structure of the coal measures facilitates the accumulation of water in the strata and mine workings. The mountains surrounding the anthracite fields are steep and the coal beds dip from the sides to beneath the valleys below. Rain-falls often overtax the pumping plants and flood parts of active mines, causing loss of production. Over the years, the annual precipitation has not varied too much, but the quantity of water entering the mines has increased tremendously as a result of the ever-increasing area of broken ground following

Table I—Partial List of Anthracite Pumping Plants With Pertinent Data

	Northern		Western Middle		Southern
	Centrifugal	Deepwell	Centrifugal	Deepwell	Centrifugal
Number of plants.....	52	2	1	2	10 to surface; six relays.
Number pumps involved	114	4	3	3	26 to surface; 18 relays.
Total plant capacity, g.p.m.....	318,555	16,000	20,400	15,000	61,400 to surface; 28,995 relay.
Investment per 1,000 gal. of capacity	\$20,155	\$22,000	\$21,300	.....	\$11,900 ¹
Total investment	\$6,420,000	\$350,800	\$426,500	.....	\$1,075,000 ¹
Gallons pumped to surface annually	64,402,979,000	3,679,200,000 ²	4,764,000,000	3,913,947,000	6,801,759,800
Annual average, g.p.m. to surface	122,500	7,000 ²	9,064	7,446	12,941
Annual cost of operation	\$2,394,000	\$93,720 ²	.....	.....	\$225,000
Net tons water pumped annually	268,238,400	.....	20,000,000	.....	28,340,700
Net tons coal mined underground annually	12,871,028	.....³	632,800	.....	2,975,166
Tons water pumped per ton of coal mined underground	20.8	.....³	32	48	9.5
Average cost per net ton	\$0.186	.....³	.....	.....	\$0.0756

Figures under "Northern Centrifugal" cover combined experience of two major companies in this field.
¹Exclusive of rock work. ²Estimated. ³Pumps operated on idle properties.

pillar extraction, cave-ins and strip-ping operations.

In addition to the increase in mine drainage caused by the breaking down of the overlying rock strata as a result of pillar removal, the problem was seriously augmented, beginning about 1932, by the exhaustion or abandonment of mining properties with imposition of their drainage load on the neighbors still working. The growth in the water problem in late years is best illustrated by the ratio of tons of water pumped to tons of coal produced underground by one of the major companies in the northern field, as follows:

Ratio: Tons Water Pumped to the Surface to Tons Coal Produced

1920	8.4:1
1925	10.6:1
1930	11.4:1
1935	26.2:1
1940	32.7:1
1945	43.8:1

While this represents the experience of only one company, the quantity of water pumped at 73 anthracite collieries increased from 19.5 tons per ton of coal in 1927 to 21.8 in 1931 and 29.3 in 1935.

The following tabulation shows the number of flooded areas that have come into existence as a result of the exhaustion of mining properties in the northern anthracite field since the early 1930's:

	Number Flooded Areas
1932	2
1933	3
1935	5
1936	7
1937	9
1938	11
1941	14
1944	26
1947	26

Similar conditions exist in other fields of the anthracite region. Operations between 1923 and 1940 in the southern field resulted in the flooding of approximately 60 square miles (30 percent). The following table shows the pools now in existence in the anthracite region, together with their water content:

Field	No. Pools	Total Gallons
Northern ..	26	16,022,000,000
Eastern ..	31	4,161,000,000
Western ..	58	38,292,000,000
Southern ..	31	32,469,000,000
Total	90	94,944,000,000

Anthracite in 1945 handled 250 billion gallons of water at a cost of \$13 million dollars. Some 200 billion gallons was pumped to the surface or to drainage tunnels at a cost of \$12 million dollars and 50 billion gallons was handled by water-level drainage tunnels and ditches and flumes on the surface at a cost of a million dollars. The

pumping head through which this water was handled varies from about 300 to 1,200 ft.

Records show that in the Susquehanna River basin, which comprises approximately 80 percent of the area of the anthracite field, the yearly precipitation has averaged 37.44 in. In the Delaware River basin, comprising approximately 20 percent of the area of the anthracite field, the average annual precipitation has been 47.60 in., with the maximum for any one year 61½ in. The average annual precipitation over the entire anthracite field has been estimated at 326 billion gallons. With a water load of 250 billion gallons, this indicates that 76.6 percent of the precipitation finds its way into the mines and is being removed largely by pumping.

Barrier Pillars—Mining in the anthracite region has been in progress about 130 years. In the early days, no thought was given to the establishment of barrier pillars. This seriously aggravates today's drainage problems. As mining progressed the need for barrier pillars was realized. Pillars sometimes were established by common consent of the operators and, in many cases, by agreement between the colliery operators and state mine inspectors.

Every mine operator, in the early stages of mining, pumped his own water, but with the exhaustion of

individual mines pumping is abandoned and the mines gradually fill up. If an abandoned mine is connected to a neighboring operation, the water then flows into the active operation and must be handled there. Only in a few instances in the northern field will the water flow by gravity from abandoned mines to the surface. In some instances, the state mine inspector, even though what appears to be a proper-sized barrier is in existence, will insist on the water head being kept down to avoid creating pressures he regards as dangerous. This necessitates drilling boreholes into the abandoned area from the active mine and keeping the head down to a level satisfactory to the inspector.

Water Problems by Fields—The northern anthracite field lies in Lackawanna and Luzerne counties. The upper portion, or Lackawanna-County area, has experienced the greatest depletion, the major remaining coal reserves lying in the lower portion of the fields, or the Wilkes-Barre area. A serious situation faces the Wilkes-Barre or Luzerne area. In other words, if the mine water from the Lackawanna-County collieries, aggregating some 30,000 to 120,000 g.p.m., is not held back or controlled when the Lackawanna collieries are abandoned, it will overflow to the lower and deeper workings and present an almost insuperable obstacle to the safe and economical operation of the lower, or Luzerne-County, portion of the field.

As we see the problem, this water will have to be pumped with many new installations in the lower part of the Lackawanna Valley—probably with deepwell pumps with sufficient capacity to handle not only an average inflow of at least 60,000 g.p.m. but perhaps a peak of around 120,000 g.p.m. This is a terrific problem and must be studied by authority greater than any one or even all of the remaining operating companies.

The eastern middle field has the smallest coal reserve of any of the fields and does not have an acute water problem as a result of the fact that, for the most part, drainage in this field is handled by drainage tunnels. However, in a number of mines, the water is pumped to the drainage tunnels at a much-reduced head.

In the western middle field, in 1927, 100 square miles of coal area, or 85 percent of the field, was tributary to active collieries. Abandonment of collieries since 1927 has reduced the active area to 50 square

miles, or approximately 40 percent of the field. The problem in this field is one of providing facilities that will minimize pumping loads during high-water periods when existing facilities sometimes are unable to cope with the inflow of water from both active and inactive mines.

Steep pitches and deep workings make pumping a costly addition to other mining expenses in the southern field. Rainfall quickly affects the workings in this field and often causes temporary cessation of operations. The largest anthracite reserve is in the southern field, where mining conditions are most difficult. The future problem is one of providing facilities that will permit dewatering and operation of abandoned collieries at minimum expense.

Estimated anthracite reserves as of 1944, by fields, are as follows ("Anthracite Reserves," Commonwealth of Pennsylvania Topographic and Geologic Progress Report No. 130):

Field	Net Tons
Northern	2,553,000,000
Eastern Middle ..	99,000,000
Western Middle ..	3,561,000,000
Southern	9,572,000,000
Total	15,785,000,000

There are billions of tons of anthracite now inundated by underground water pools. I am unable to state the total definitely at the present time. The preceding estimate includes such tonnage. Consequently, the anthracite industry has a life expectancy less than that indicated by published reports because of the serious water problem affecting everyday operation of active collieries and because of the flooding or threatened flooding of reserves.

Pumping Problems by Fields

A river or a major creek flows over virtually every coal basin in the anthracite region. All of them prove troublesome, to say the least. There are 750 miles of rivers and streams crossing the coal measures. Seepage from the wash underlying the stream beds is an important source of inflow. Occasionally, breaks in the stream bed itself have caused the flooding of mines.

In the northern field, where the coal seams vary from 2 to 25 ft., surface subsidence from final extraction is inevitable. Generally speaking, in the Lackawanna end of the northern field, there is little clay in the wash overlying the rock. Therefore, when the rock strata are

broken as a result of mining, considerable water seeps into the mines. Much of the surface wash in the Susquehanna River contains a blanket of clay that reduces the seepage in that part of the northern field.

The flatter coal measures in the northern field permit larger water storage in reserve underground sumps. Sudden inflows of water during flash floods or prolonged periods of excessive rain can be stored and pumped during dryer periods. Examples of reserve sumps in active operations are: Eddy Creek shaft, Clark bed reserve sump, tributary to the Dunmore-bed pumping station, capacity 80,000,000 gal.; Eddy Creek shaft, Dunmore No. 4 bed, 39,000,000 gal., with an additional 37,000,000-gal. sump in the making. Both the latter sumps are tributary to pumps located in this bed.

Where it is necessary to pump water from an abandoned operation, the controls, if possible, are located so that the abandoned mine becomes a reserve sump. The inflow to the active operation is regulated and the height of the water in the abandoned mine controlled within limits considered safe for the active operation. Examples of abandoned mines so controlled at the Marvine colliery are:

Pancoast colliery: 142,747,000 gal. of reserve storage above control points.

Richmond colliery: 171,892,000 gal. above control points.

Two of our wettest months are July and August, when we frequently have very heavy rains for several days at a time and occasionally a cloudburst or flash flood. One of the worst of these combinations was in 1922, when The Hudson Coal Co. lost its Jermyn pumping station and, as a result and at a cost of over \$1,175,000, installed a modern 38,000-g.p.m. concealed pumping station. This installation, during its life, successfully withstood the assault of flood waters many times. In May, 1942, after a disastrous flash flood, water was stored in the reserve sump immediately over the station to a vertical height of 125 ft. The reserve sump held 255,000,000 gal. at this peak. The flood period lasted 35 days, during which 1,798,248,000 gal. of water was discharged to the surface.

The Jermyn mine has now been exhausted and the station abandoned. Fortunately, there are adequate barrier pillars that isolate the basin and the water flows to

Pumping and Surface Prevention Control Anthracite Water Flow

daylight through a portal provided for that purpose. During recent spring thaws, as much as 67,000 g.p.m. has been measured flowing from the mine. In previous years, during similar wet periods, the sump would fill and, as the inflow decreased, the pumping plant would gradually reduce the sump capacity to normal.

During the period the underground pool formed in the Jermyn basin first overflowed to the surface, tests showed the water to be alkaline and similar in composition to that of surface streams in the vicinity. More recent tests show the presence of small quantities of acid. One sample contained 1.14 grains of free sulphuric acid and 7.7 grains of total acid per gallon. Since the overflow has been in existence only a few months, the time has been too short to determine whether the acid content of the water will depend upon the quantity flowing or the season of the year.

The situation at the Gravity Slope Riverside pool is similar. This pool was formed by the accumulation of mine water in worked-out and abandoned territory, now flowing to daylight. This water also has changed from alkaline to acid.

Extending north about six miles from Scranton is an area offering an outstanding example of the effect of exhaustion and abandonment of independent collieries and their pumping plants on the pumping load of The Hudson Coal Co. The underground drainage district embraced by this territory is about 15.4 square miles—8.9 square miles of foreign operations and 6.5 square miles of Hudson operations. The general surface elevation is 750 ft. above sea level; the deepest point is 20 ft. below.

The general pumping situation can best be illustrated by listing the installed pumping capacity when all operations were active, compared to present-day installations. The situation prior to 1932 was as shown in the following:

Foreign Collieries

	No. Plants	Rated G.P.M. Pumping Capacity to Surface
Sterrick		
Creek ...	1	3,000
Mt. Jessup.	1	5,200
Johnson ...	2	7,500
Lackawanna	2	17,300
Pancoast ..	2	6,000
Richmond .	2	6,000
Legitts		
Creek ...	2	13,000
West Ridge.	1	4,000
Subtotal ..	13	62,000

Hudson Coal Collieries

Olyphant ..	2	3,945
Eddy Creek	3	17,550
Marvine ...	1	4,450
Dickson-		
Manville .	1	2,000
Subtotal. . .	7	27,945
Grand		
Total ..	20	89,945

Coal exhaustion, economic exhaustion or both gradually proceeded from the north and, over the past 15 years, all the foreign collieries have been abandoned, with their pumping loads thrown on the remaining Hudson Coal operations. The situation as of today is as follows:

Foreign Collieries

	No. Plants	Rated G.P.M. Pumping Capacity to Surface
None

Hudson Coal Collieries

Olyphant ..	3	13,170
Eddy Creek	1	18,450
Marvine ..	1	22,000
Total	5	53,620

Comparison of the two tables shows that Hudson Coal pumping capacity has increased from 27,945 to 53,260 g.p.m. The latter takes care of all the mine pumping to the surface in the 15.4 square miles formerly handled by an installed capacity of 89,945 g.p.m. During 1946, one of the foreign operations was reopened. Installation of two 4,000-g.p.m. deepwell pumps has relieved the Olyphant plant to some extent.

This total pumping capacity of 53,260 g.p.m. is small compared to known inflows and would be wholly inadequate if the inflow had to be dealt with as it came. There are nine fully or partially flooded properties within the drainage area. Five of these now are used as vast storage sumps, with the water controlled at suitable levels by valves on boreholes through barrier pillars.

The pumps that handle this large volume of water are of the modern centrifugal type, electrically driven. They usually are installed in groups of two to four in concealed or semi-concealed pump rooms. The Marvine pumping plant is a typical example.

Marvine Plant and Pool—A concealed pumping plant with a capacity of 22,000 g.p.m. at normal sump elevation is installed at Marvine colliery. The plant comprises four

5,500-g.p.m. pumps driven by 1,000-hp. motors. In 1932, as a result of cessation of pumping at neighboring operations, it was necessary to abandon the lower workings, seal off the shaft and install two of the preceding pumps over the seal to handle the water. Subsequently, and again as a result of cessation of pumping at neighboring mines, two additional pumps were installed.

Water is presently pumped not only from the Hudson Coal mine but also from five abandoned operations as well. The pumping load at this property during 1945 was 17,843 g.p.m. based on continuous operation. The static head through which the water was pumped varied from 452 to 504 ft. During this period, the station successfully withstood a rise in sump level of 41 ft. vertically above the pump-room floor. At this point, the sump contained 225,500,000 gal. of water. Below this active sump is an accumulation of 763,000,000 gal. of dead water.

Pumping Problems in the Southern and Western Middle Fields—

Pumping problems in all these fields follow the same general pattern. Sources of inflow are the same except that these areas experience a heavier annual rainfall than the northern field. However, in these fields, as a result of steeply pitching beds and depth of workings, large underground storage areas and working sumps are physically impracticable. Pumping of sudden inflows, therefore, must be done immediately.

Pumping stations in the southern field frequently are placed in rooms excavated in the rock strata. Moderate-sized sumps also are made in the rock. Large installations frequently include twin sumps—one on each side of the pump room—and the suction, in some cases, is arranged so that half the pumps draw from one side and half from the other. In dry periods, water is diverted to one sump while the other is cleaned. This is a more complicated and expensive arrangement.

In the heavy-pitch territory, mining progresses gradually down the pitch. This frequently results in the main pumping plants becoming relay stations, particularly when the head becomes too great. This makes it unnecessary to scrap a pumping station, thus keeping down the total cost, but it does mean a slightly higher operating cost.

Drainage tunnels are an impor-

tant means of dewatering active or abandoned mine workings. They are feasible, however, only where coal basins lie, for the most part, above the natural drainage level of the surrounding surface. There are several drainage-tunnel systems in the anthracite region, with the larger number and more outstanding in the eastern middle field. Twenty-two such drainage tunnels, with a combined length of 138,000 ft., handle water from active and abandoned mines. Of these, only two, with a total length of 14,960 ft., are in the northern field, and only one (19,890 ft.) in the southern. There are four, with a combined length of 18,995 ft., in the western middle field. The remainder, 84,155 ft., are in the eastern middle field.

The more-prominent drainage tunnels in this field are the Jeddo, Beaver Meadow, Audenreid, Green Mountain, Oneida and Sandy Run. The Jeddo tunnel was constructed in 1891-94. A series of connecting and auxiliary tunnels aggregating 42,887 ft. have been driven over the years as the necessity arose. The capacity of this tunnel is 150,000 g.p.m. During one flood peak, the weir registered 139,100 g.p.m. The average minimum daily flow for an average month is 11,030 g.p.m.; maximum, 22,190 g.p.m.

Typical Anthracite Pumping Plants—Since anthracite mining began, pumping equipment has progressively improved in efficiency and arrangement to cope with ever-increasing water volumes. From 1897 to 1908, large compound and triplex expansion steam pumps were installed in most anthracite main pumping stations. Their capacities, at maximum speed, varied from 1,450 to 2,250 g.p.m., through static heads of 250 to 500 ft. Most of these pumps had an average life of approximately 30 years and have been replaced by modern centrifugal units with larger capacities.

Beginning in 1920, large-capacity high-head centrifugal pumps have been installed almost exclusively in all major pumping stations. This type of pump requires a minimum of space, has few running parts and consequently a low maintenance cost, and has high efficiency. The pumps are made almost exclusively of bronze castings with bronze, chrome-iron and chrome-nickel-steel impellers to resist corrosion from acid mine waters. Units with capacities of 6,000 g.p.m. and driven by 1,000-hp. motors are not uncommon.

The pumps usually are installed

in groups of one or two discharging into column lines in shaft compartments, slopes and boreholes. Column lines usually are constructed of cast-iron pipe, with or without lead or wood lining, or of Transite. Automatic self-priming equipment usually is employed where required. Protective devices normally are installed on suction, pump and discharge to guard against failures at each of these points.

A recent development is the adoption of the deepwell-type pump for use on the surface or underground. Usually, the same acid-resisting materials are employed. It has been found more economical and dependable to use deepwell units where large and sudden inflows would jeopardize pumping stations at or below the drainage level. Table I includes data on several anthracite installations.

It will be noted that installed pumping capacities in the northern field are about three times the average pumping to the surface, against five times in the southern region. In the northern field, large sumps absorb flood inflows and permit dewatering at a slower rate. In the southern field, small sumps make it necessary to pump flood waters at a faster rate, requiring higher pumping capacities.

Mine Dams—The general purposes for which underground dams have been constructed in the anthracite region are:

1. To prevent inflow of large quantities of surface or subsurface water into open workings.
2. To confine drainage to exhausted or abandoned workings.
3. To create storage reserves to control flood inflows.
4. To build sumps for pumping stations.
5. To isolate mine workings to prevent the spread of and to extinguish mine fires.

Dams usually are constructed of plain or reinforced concrete, brick or stone masonry. Temporary dams also may be constructed of wood. Water heads against these dams range from a few to several hundred feet. In heavy-pitching territory, temporary dams or bulkheads often are installed in supports previously constructed to receive them. These serve to isolate and protect pump rooms or sections of mines during flood periods when inflows temporarily exceed pumping capacity. Pumping equipment or producing sections often are saved from

inundation by these temporary structures.

Surface Prevention—On the preventive side, in view of the high cost of pumping, huge sums constantly are being spent to keep surface water out of mines. This work comprises constructing ditches and flumes of all types across broken ground, filling in cave holes and patrolling the surface. Many large channels are constructed of various materials. For topographic reasons, some are made of rubble stone and concrete; others are in natural ground.

Wood and metal flumes are constructed to carry streams across sections where future settlement may occur. These permit later regrading in the event of settlement and also quick repair of breaks in the structure. Flumes range in size from 36 to 96 in. and are either box-shaped, V-shaped or semi-circular.

The Glen Alden Coal Co. has installed and maintained approximately 6,000 lineal feet of semi-circular wood flumes in the Scranton area. South of Wilkes-Barre, the company has installed over 10,000 ft. of wooden flumes along with several miles of earth and paved ditches to deflect water from vein outcrops and broken ground. One such installation is the Warrior Run flume 90 in. in diameter and 3,200 ft. long. In the eastern middle field, Glen Alden maintains approximately 3,000 ft. of wood flumes 72 in. wide. Similar installations too numerous to mention exist in other fields. An extensive program of surface preventive measures should be undertaken on abandoned and idle properties to improve the over-all drainage situation. This undertaking, however, is beyond the financial ability of the industry.

Cooperative Pumping Agreements, Northern Field—As a result of the many complications arising out of water problems when neighboring mines were abandoned, the Glen Alden, Lehigh Valley and Hudson coal companies have found it advantageous to approach the problems jointly. As a result, a number of agreements have been made between the companies, as follows:

1. Kingston Water Agreement

Companies involved—Glen Alden, Lehigh Valley, Hudson Coal.

Purpose—To pump water from abandoned Kingston Coal Co. workings.

Date—July 31, 1940.

Pumps involved—Two at 3,700

g.p.m.; one at 3,000 g.p.m.; total, 10,400 g.p.m. at a head to the surface of 593 ft.

Capital expenditure — \$83,261, covering installation of one 3,000-g.p.m. pump and facilities; divided as follows: Glen Alden, \$41,631; Lehigh Valley, \$12,489; Hudson Coal, \$29,141.

Operating cost to date—\$175,671, divided as follows: Glen Alden, \$79,813; Lehigh Valley, \$34,390; Hudson Coal, \$61,468.

Gallons pumped during life of agreement—5,620,020,280.

2. East Boston Pumping Agreement—Supplement to Kingston Water Agreement

Companies involved—Glen Alden, Lehigh Valley and Hudson Coal.

Purpose—To continue pumping operations at East Boston colliery to prevent accumulation of water that would endanger the properties of the three companies involved, provide time to construct passageways for water to a common pool and construct a pumping station at that pool.

Date—March 1, 1946.

Capital expenditure—\$44,893; divided as follows: Glen Alden, \$17,957; Lehigh Valley, \$11,223; Hudson Coal, \$15,713.

Operating expense — \$194,472; divided as follows: Glen Alden, \$77,788; Lehigh Valley, \$48,618; Hudson Coal, \$68,066.

Gallons pumped—1,862,456,600.

3. Kingston-East Boston-Black Diamond Pumping Agreement—Supplement to Kingston Water Agreement

Companies involved—Glen Alden, Lehigh Valley and Hudson Coal.

Purpose—To construct and operate a deepwell pumping plant at Kingston No. 4 shaft to pump water from a common pool in abandoned foreign properties.

Date—Aug. 20, 1947.

Pumps involved — Two 4,000-g.p.m. deepwell units to operate against an average head of 399 ft.

Capital expenditure — \$237,500, divided as follows: Glen Alden, \$95,000; Lehigh Valley, \$59,375; Hudson Coal, \$83,125.

Estimated future operating expense—\$45,000, divided as follows: Glen Alden, \$18,000; Lehigh Valley, \$11,250; Hudson Coal, \$15,150.

4. Pine Brook Pumping Agreement

Companies involved—Glen Alden and Hudson Coal.

Purpose—To pump mine water accumulating in the abandoned

Pine Brook colliery by Glen Alden at its Baker colliery, to prevent inflow of this water into Hudson Coal mine workings and to prevent undue pressure on barrier pillars between Glen Alden workings.

Date—April 1, 1941.

Pumps involved—Two at 2,200 g.p.m. and one at 4,200 g.p.m., operating against a static head of 370 ft.

Capital expenditure — \$26,474 for installation of 4,200-g.p.m. pump and appurtenances, divided as follows: Glen Alden, \$13,237; Hudson Coal, \$13,237.

Operating cost to date—\$210,508, divided as follows: Glen Alden, \$105,254; Hudson Coal, \$105,254.

Gallons pumped—8,052,139,650.

5. Hollenback Pumping Agreement

Companies involved—Glen Alden and Hudson Coal.

Purpose—To pump Peach Orchard colliery water of Glen Alden, Mineral Springs colliery water of Lehigh Valley and Baltimore colliery of Hudson Coal at Hollenback colliery.

Date—June 1, 1942, retroactive to July 16, 1941.

Pumps involved — Two 5,500-g.p.m. pumps, 236-ft. total dynamic head, relaying to three 3,500-g.p.m. pumps, 420-ft. total dynamic head, delivering to the surface.

Capital expenditure—Estimated at \$210,000, assumed by Glen Alden.

Operating cost—\$292,444, divided as follows: Glen Alden, \$146,222; Hudson Coal, \$146,222.

Total gallons pumped to date—9,103,650,000.

6. Greenwood-Cayuga-Marvine Pumping Agreement

Companies involved—Glen Alden and Hudson Coal.

Purpose—Pumping and disposal of mine waters for the mutual protection and benefit of both.

Date—Dec. 31, 1945.

Pumps involved—Two at 4,000 g.p.m., 83-ft. head, Greenwood colliery; four at 5,500 g.p.m., 488-ft. head, Marvine colliery.

Capital expenditure, Greenwood—\$77,000, divided as follows: Glen Alden, \$51,333; Hudson Coal, \$25,667.

Capital expenditure, Marvine—\$445,995, assumed by Hudson Coal. Operating expense—Assumed entirely by each operating company, with provision for payment for excess million foot-gallons.

Since July 31, 1940, the cooperative pumping agreements previously

listed have involved capital expenditures as follows: Glen Alden, \$411,133; Lehigh Valley, \$71,822; Hudson Coal, \$597,066; total \$1,080,021. Operating expense has totaled \$885,381, divided as follows: Glen Alden, \$412,395; Lehigh Valley, \$83,008; Hudson Coal, \$389,978.

Gallons pumped to date total 25,776,157,450.

There has been in force since 1941 a joint pumping agreement among Glen Alden, Lehigh Valley and Hudson Coal for pumping the water from the abandoned mines of the Kingston Coal Co., near Wilkes-Barre. The water was pumped at the Loree colliery of Hudson Coal with existing pumps, plus one additional 3,000-g.p.m. pump installed under the agreement and operated in high-water periods.

Since the original agreement became effective, other mines have been abandoned and their water joined the Kingston pool. This necessitated a new study and revision of cost allocations, and resulted in the installation of a deepwell pumping plant at the old Kingston No. 4 shaft. This plant at present consists of two 4,000-g.p.m. Peerless deepwell pumps with 500-hp. motors working against a head of approximately 399 ft.

It is anticipated that all of the pumping will be done during the off-peak period. Average draw from this pool will be 5,760,000 gal. per 24-hour period. The cost of the plant, including power lines, surface water courses, two pumps, headframe, etc., was \$237,500. The plant went into service Jan. 6, 1948. As a further safeguard, another 4,000-g.p.m. deepwell unit has been ordered for this plant, at an estimated installed cost of \$64,500.

References and Acknowledgments—
"Mine Water—A Major Problem in the Pennsylvania Anthracite Mines," S. H. Ash, district engineer, U. S. Bureau of Mines; October, 1940.
"Water Problems in the Pennsylvania Anthracite Mining Region," S. H. Ash, district engineer, safety division, U. S. Bureau of Mines; L.C. 7175, June, 1941.
"Flood Prevention Projects at Pennsylvania Anthracite Mines," preliminary study by S. H. Ash, chief, safety division (supervision engineer), and James Westfield, mining engineer, safety division, U. S. Bureau of Mines; R.I. 3868, March, 1946.
"Flood Prevention Projects at Pennsylvania Anthracite Mines," progress report for 1945 by S. H. Ash, W. E. Cosup, James Westfield, W. L. Eaton, William Romischer, E. J. Podgarski and L. H. Johnson, U. S. Bureau of Mines; R.I. 4109, August, 1947.
"Arrangements for Handling Mine Water in the Scranton-Olyphant Section of the Northern Anthracite Field," W. S. Lutz, division engineer, and J. T. Griffith, engineer, The Hudson Coal Co.; A.I.M.E. Technical Publication No. 1826, February, 1944.
"Mine Drainage Practice in the Anthracite Region of Pennsylvania," Edward Griffith, vice president and general manager, Glen Alden Coal Co.; A.I.M.E. Technical Publication No. 1907, 1945.



A VICTIM OF CARELESS HANDLING—Bracket damaged enough to impair explosion-proof feature. Wall of lower end hole chipped out; top hand hole and cover also damaged.



USE OF SPLIT BRUSHES to raise commutation efficiency is an increasing practice. This illustration shows split-brush construction and brush holder used on many types of mine motors.

Better Motor Maintenance

Operation at Rated Voltage Key Factor in Lengthening Motor Life and Reducing Downtime — Other Critical Points Are Field Coils, Dipping and Baking, Inspection and Parts Supplies—Split-Brush Advantages

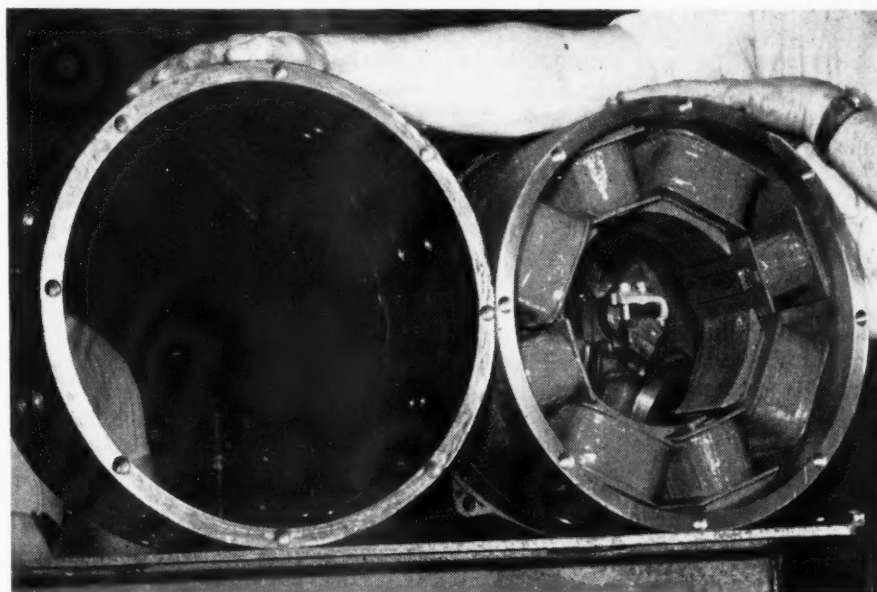
By C. E. HUGUS

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THE RAPID INCREASE in the rate at which mines are being mechanized today makes maintenance an increasingly important operation. Everyone is well aware that when a cutting machine, loader or other piece of mechanized equipment goes down, production is lost. Where such interruptions are common because of poor maintenance, that particular mine is likely to find itself flirting with the red side of the ledger.

Fortunately, the mining industry has been foresighted in handling this problem and, generally speaking, equipment maintenance in the coal industry is better today than in many a comparable industry. This situation has been brought about through organization of sectional maintenance associations, training of maintenance personnel in specific skills at coal-company or equipment-manufacturer schools, and training of operators at similar schools in ways and means of achieving maximum production and machine life. In addition, and probably most important from a long-term viewpoint, trade schools and vocational courses in public schools have been established to train young men for the mining industry.

There are, however, some points about maintenance—more particularly about maintenance and operation of electric motors—which still bear reviewing and repeating. No attempt will be made to cover them



MATCHING SURFACES AND FITS of explosion-proof motors require precision machining. Damage to the motor frame at the left in disassembling it has destroyed its explosion-proof characteristics. Note particularly pitting and gouging. The motor frame at the right shows the appearance with proper explosion-proof surfaces.

HOW TO LENGTHEN MOTOR LIFE

DO

1. Use the best possible dipping and baking cycle and varnish when rewinding.
2. Make periodic check of motors on fixed schedule from check list.
3. Use recommended parts and lubricants.
4. Carry spare motors and make repairs in central shop.
5. Make recommended adjustments.
6. Keep interior of motors clean and oil free.
7. Maintain control equipment properly, especially contacts.
8. Carry an adequate supply of spare parts to eliminate cannibalizing.

9. Use wiring diagrams when reconnecting motor or motor fields.
10. Rewind only in reputable shops.

DON'T

1. Operate equipment at under voltage.
2. Operate equipment at over voltage.
3. Grind armature laminations away in attempt to dislodge insulation from previous winding.
4. Over-lubricate.
5. Burr fits or otherwise damage permissibility features when disassembling or assembling motor.
6. Operate equipment at overload.
7. Reconnect motor from memory.

all, but I would very much like to summarize a few, especially those concerning d.c. motors.

A feature which has a major effect on maintenance is the voltage on which the motor design is based. Modern, aggressive organizations spend a lot of time and money maintaining the voltage of the power supply as near the rated motor voltage as possible, since they have found that it is time and money well spent.

As is well known, standard voltages are 115, 250, 500 and—for battery operation—90 volts. But motors in the 250-volt class sometimes are designed for 230 and 210 volts or, at the opposite extreme, 280. The standards of the electrical industry stipulate that motors shall operate successfully at rated load with voltage not more than 10 percent above or below rated, but not necessarily in accordance with the standards established for operation at rated voltage. This means that a motor designed to operate at 250 volts must deliver the horsepower specified on the nameplate at voltages ranging from 225 volts to 275 volts. Within this range a good motor will deliver as specified at approximately the temperature specified, although at the lower or the higher voltage the temperature rise may be exceeded and the motor still meet industry standards.

If a 250-volt motor is operated any length of time at rated load and voltages on the order of 210 to 220, or 280 to 290, it will overheat and eventually fail. This is because at the lower voltage the motor draws more current than is normal and—temperature rise being directly proportional to the square of the current—a comparatively small increase in current means a compara-

tively large increase in temperature. At the higher voltage, the field excitation and armature speed are both increased. This results in increased heating because of increased copper losses plus greater core loss in the motor.

Core loss in the iron of a motor is made up of two parts, one of which is proportional to the square and the other to the 1.6th power of the flux density, which in turn is proportional to the voltage. Both of these are directly proportional to the frequency of flux reversals, which in turn is a function of the armature speed.

Field coils are an important item in any discussion of motor maintenance. They are designed with a fixed number of turns of wire of a given size and resistance to give the desired torque and speed or, in other words, horsepower, because horsepower is a combination of these two. That is why when old coils are being replaced with new ones, care should be taken to use coils which—within close limits—have the same number of turns and the same wire size and resistance. A good tolerance here would be plus or minus 5 percent.

In other words, a motor with four coils, having a combined total resistance of 2,200 ohms, should be rebuilt with new coils having a total field resistance of between 2,090 and 2,310 ohms. If the coils to be replaced each had 1,500 turns, the new coils should each have between 1,425 and 1,575 turns. Actually, of course, the coils should be held as closely to the original specifications as possible. The 5 percent represents the maximum tolerance which should not be exceeded.

If coils were used which did not meet these specifications, the motor,

when reassembled, would not perform in accordance with the nameplate rating. If high-resistance coils were used the motor would run faster than normal and have less torque. If low-resistance coils were used the motor would run slower and have more torque than was required.

Another situation to avoid is winding coils to have exactly the same resistance as the originals but with more or less than the required number of turns. This actually can happen because of increased or reduced tension on the wire as it is formed into the coil. A good, reputable repair shop is aware of this possibility and is not likely to let it occur.

Still considering motor characteristics, another possible cause of variations in performance is the omission of the shims quite frequently found between the poles and the motor frame. Motor manufacturers, in many instances, have made a practice of using shims to gain the advantage of large production runs through standardization of motor-frame bores. By so doing they are able to build motors with different characteristics in the same frame ring through shimming to the gap specified by the design. In addition, the use of shims permits manufacturing within close tolerances to the characteristics desired.

Roughly speaking, the speed of a motor can be increased by increasing the motor air gaps or decreased by decreasing them. It is obvious, then, that if a motor had 0.020-in. shims between the frame and each pole, and these were omitted in reassembly, the air gap would be 0.020 in. greater than called for by the design, resulting in weakened fields and increased motor speed.

Further, if the shims were not replaced behind two of the poles of a four-pole motor, but were added instead to the shims behind the other two poles, an unbalanced condition would result, which probably would be evidenced by sparking on the commutator.

Motor Wiring Often Faulty

Up to this point we have been concerned with main pole shims. On certain types of motors, thick brass shims are used between the frame and each interpole to make the motor commutate more efficiently under fluctuating load conditions. These, of course, should be reassembled in the proper manner.

It is general knowledge that on a motor equipped with interpoles, the interpole polarity should lead that of the main pole. In other words, looking at the commutator end of a motor that is to run clockwise, if the top main pole is positive in polarity, the interpole to the right should be positive. Continuing in a clockwise direction, the next main pole should be negative and the next interpole negative, and so on around the field ring. This fundamental rule, however, is violated with surprising frequency, with resultant severe sparking and flashing and shortened commutator and motor life. A major cause is incorrectly connecting the rewind armature. The result is throwing the leads to the left instead of the right and vice versa. When such a condition is discovered, the armature should be returned to the rewinding shop to be corrected if it is essential that the motor connections be maintained standard for interchangeability. If this is not so essential, the internal motor connections can be changed to make the correction. The other major cause of severe commutator sparking is, simply, incorrect connection of the fields when reassembling the field frame. This can be avoided, of course, by following the approved wiring diagram.

The practice of grinding armature slots to remove old insulation that adheres to the sides is another procedure that should be avoided. The teeth on these armatures are frequently ground away so badly that the flux density is increased, with resultant increase in heating. When the motor already is operating at full load, or at some degree of overload, this aggravates an already bad condition.

It is vitally important that the permissibility features of a motor

be maintained. This should be kept in mind both in disassembling and in reassembling a permissible motor. It is at such times that the greatest possibility exists of damaging bracket fits, forgetting to replace lead outlet bushings or packing, or otherwise violating the permissibility features.

Jack-screw holes are included in all the more recent designs and most of the older ones. These permit removal of the brackets without prying or driving with a crowbar or chisel. It is well to keep in mind the salient features of these motors, which are: (1) an uninterrupted flame path, as originally provided, must be maintained on all fits; (2) all such fits must be free of tool marks, nicks and burrs. This means that in addition to exercising care to prevent damage to fits, replacement shafts must be properly machined so that all diameters are as originally designed. Cable used to replace original cable must be of the same outside diameter.

An important part of any good maintenance policy is intelligent, periodic check-up of all motors in operation. In this way, downtime resulting from such things as pitted commutators, cracked or worn-out brushes, solder thrown from leads, or dirty surfaces permitting creepage to ground, can be prevented. These checks should be made on a fixed schedule and detailed records kept. Brush-holder spring pressures should be adjusted in accordance with equipment manufacturer's recommendations during any such check.

Spare Parts Cut Downtime

One of the best ways to minimize downtime is to keep available an adequate supply of quality spare parts, since, by so doing, it will be possible to return the machine to service quickly. The worst thing that can happen is for the supply to fall to the point where cannibalism of parts from other equipment is resorted to.

I have seen explosion-proof equipment being operated with only about 10 percent of the cap screws required to hold a cover on because the screws had been appropriated for use on other equipment. In this connection, it also is well to carry spare motors, wherever possible, to permit complete motor overhauls in central shops rather than replacing individual parts on the job in the mine. This also makes it easier to keep dirt out of bearings and motor casings, whereas the opposite is all

too frequently the rule when repairs have to be made in the mine.

Experience has indicated that one method of insuring long motor life under severe conditions is to dip and bake all windings at least three times in a high-quality baking varnish. There are a number of good varnishes on the market, but probably the best are the synthetic thermo-setting plastic types. The life of a motor is closely related to the degree to which windings are bonded into a solid mass and sealed off from moisture and dirt. This too often is neglected in the rush to get a motor back into operation.

Use of Split Brushes Growing

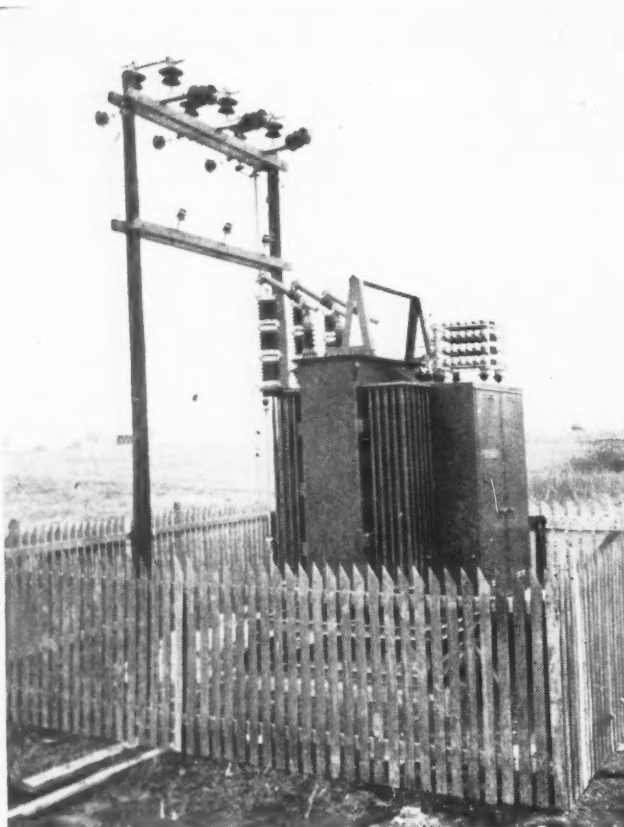
A great deal could be written about brushes and brush holders alone. To make one point, however, there has been a recent trend to the use of split brushes, each half of the brush being actuated by a separate finger. This is, in effect, using two brushes in the same holder.

The purpose of this type of brush is to obtain better commutation on the theory that with two brushes instead of one sufficient contact with the commutator face will be maintained at all times even after the commutator becomes roughened or a condition of "high mica" develops. This, of course, is very worth while and experience seems to show that there is a definite improvement.

The consequent-pole motor is being used more and more in the mining field. Ordinarily the motor designer adopts the consequent-pole type of design only where space considerations are a determining factor. In building large motors for coal-mining equipment, one of the limiting considerations, of course, is the height of the motor.

In a consequent-pole motor there are four poles, two of which are active poles of the same polarity and two are dummy poles of opposite polarity as a result of the polarity of the active poles. Hence the name consequent-pole. It is important with this type of motor that the poles which have the field coils installed on them (the active poles) should always be connected to have the same polarity. If they are connected to have opposite polarity, a two-pole motor field ring would result which, of course, would not work with a four-pole armature.

Steps that mine operators can take to achieve the longest possible motor life with a minimum of downtime are summarized in the accompanying tabulation.



FIVE UNIT SUBSTATIONS (four 1,500 kva. units and one 2,000) make it easier to maintain good voltage at the pits.



THIS SWITCHGEAR PANEL at the unit substation permits checking voltage and current on all three phases at any time.

Maumee Electrical Progress

Modern Unit Substations and Switch Houses Provide Better Protection for Strip Units and Personnel—High-Line Construction Stressed—Changes Made in Dragline Circuits—Extra Relays Improve Starters in Tipples

By EVANS BENNINGTON

Superintendent of Electrical Maintenance, The Maumee Collieries Co.,
Terre Haute, Ind.

And R. R. RICHART
Associate Editor, Coal Age

ELECTRICAL PROBLEMS at the stripping operations of The Maumee Collieries Co., Terre Haute, Ind., range from the rewiring of tipples to the making of fractional-ampere adjustments in the field circuits of the Amplidynes, or regulating exciters, of the 25-yd. draglines. Careful planning and the execution of a thorough preventive maintenance program, plus utilization of such factory-made equipment as unit substations and switch

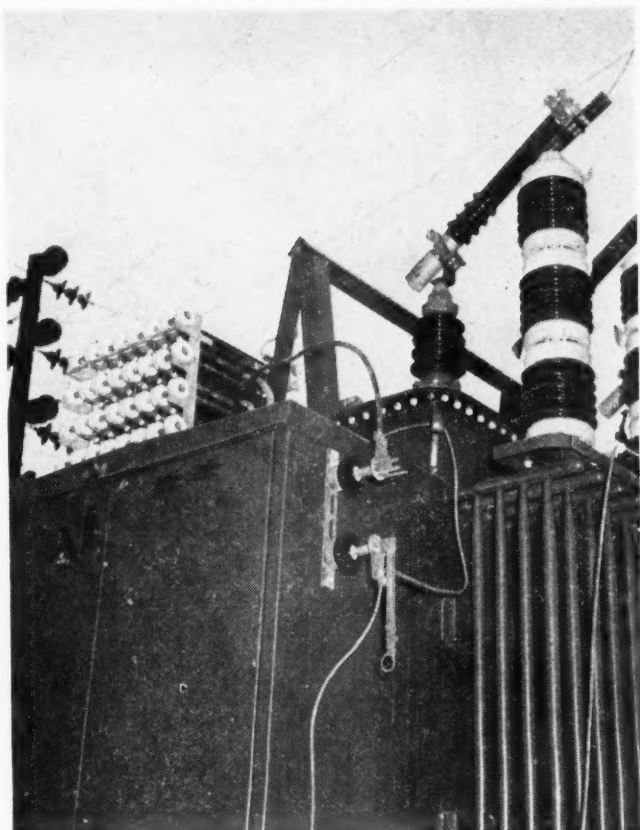
houses, have eliminated many delays and upped production.

Five unit substations (four 1,500-kva. General Electric units; one 2,000-kva. Westinghouse unit) help provide better voltage at the Maumee pits and also keep substation moving costs at a minimum. The stations are moved, on an average, every two or three years and each move now requires about 8 hours. Prior to each move, a service tap from the 33,000-volt line is arranged

for at the new location through the installation of a pole-mounted air-break switch. Also, a concrete foundation 8 in. thick, without reinforcing, is provided.

A bulldozer assists in loading the unit substation onto a highway-type tractor-trailer unit. Then the 30-in. high subbase, fashioned from old 80-lb. rails electrically welded, is secured to the dozer's blade and transported to the new location. The subbase facilitates the loading and unloading of the substation when moved on the highway trailer.

The fact that only a few electrical connections are involved in the relocation of a unit substation outweighs, in the minds of the management, many of the other advantages of the unit. The construction crew has to deal with only the three incoming lines (delta-connected primary supply) and the four secondary or load wires (Y-connected transformer secondary). After those connections are made at the new location, load may be applied to the substation. The worst thing that can happen is that the phase



A SINGLE-POLE SWITCH is used to shunt around the ground-fault current protective equipment when "shooting" cable runs.

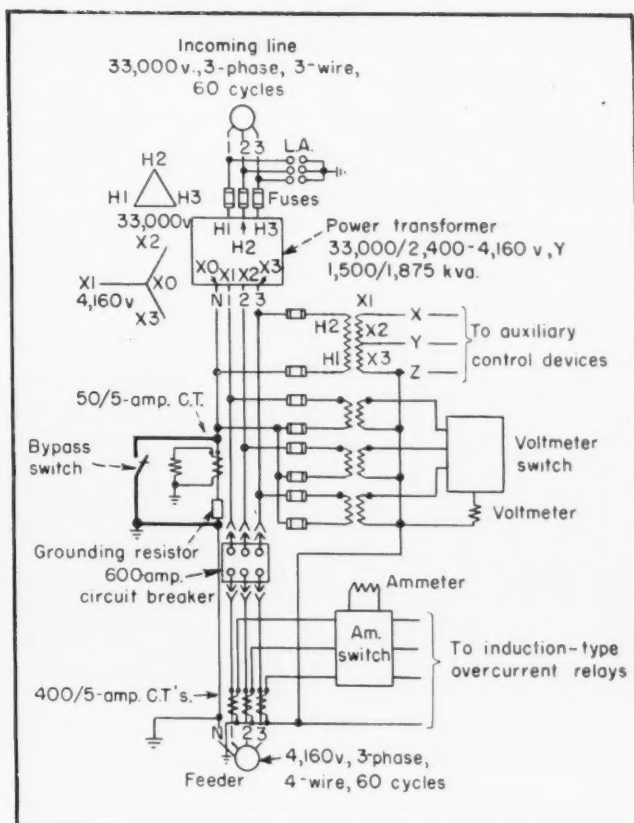


FIG. 1—HOW THE BYPASS SWITCH on the unit substation shunts around the ground-fault detecting equipment.

sequence to the load is reversed, causing the synchronous and induction drives to attempt to rotate in the wrong direction. Interchanging two of the phase wires leaving the transformer's secondary will correct this condition and establish the correct phase sequence on the pole-line circuits.

Each unit substation, as illustrated elsewhere in this article, is protected by General Electric Thyrite station-type arresters and 50-amp. Schweitzer & Conrad fuses on the primary side. On the secondary side, a 46-ohm 50-amp. grounding resistor is placed in the neutral, or ground, wire between the transformer's neutral and the nearest substation ground affecting the ground wire. A 50/5-amp. current transformer located in this ground-wire circuit, between the grounding resistor and the neutral of the transformer, detects the flow of ground currents resulting from ground faults on the distribution system. Thus, a grounding relay is made to trip the secondary breaker, deenergizing the load.

The use of the grounding resistor to limit the flow of ground-fault current, thus limiting the voltage drop in the high-resistance portions of the path that the fault current chooses to take, is believed to

be the most positive and practical scheme yet developed for safeguarding strip-mine personnel against electrical shocks. This type of protection is designed to eliminate the possible existence of a dangerously high voltage between earth and the frames of strip-mine equipment.

Bypass Switch for Cable Test

The bypass switch (Fig. 1) located on the transformer tank is used to shunt around the ground-detecting circuit when the electrical maintenance crew is attempting to "shoot" sections of the portable cable. Normally, the ground relay trips the power before the puncturing of the insulation has time to smoke and show up the spot that is in trouble. Good preventive maintenance calls for locating and repairing these spots during the dry weather spells—before the rainy nights cause the trouble to reappear.

More selective tripping was Maumee's reason for switching to General Electric's newest cable-skid switch house for the 4,160-volt distribution circuits serving the various strip pits. The newest unit (Fig. 2) has a "donut" current transformer through which the

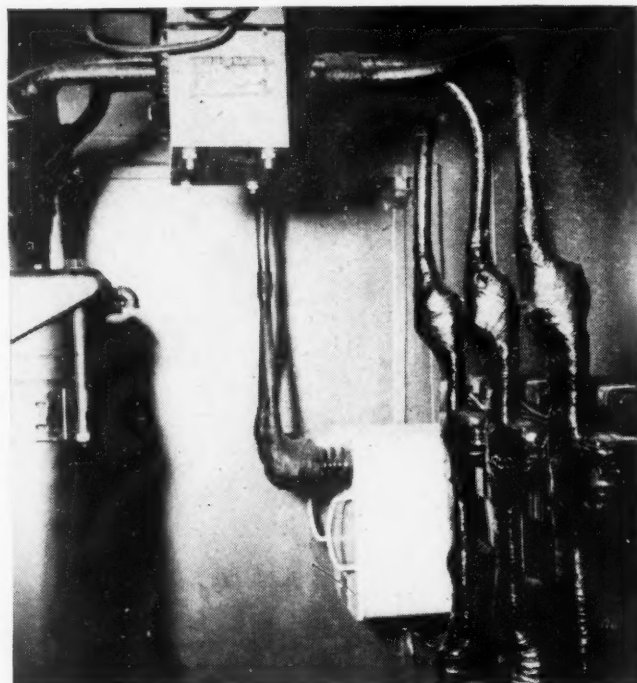
three phase wires are threaded. Any unbalance of the current in the three leads is detected by this special current transformer and the circuit breaker is tripped instantly. The grounding of a phase wire will create an unbalance sufficient to trip the breaker, thus providing a maximum of safety to workmen and equipment.

Before the introduction of the model containing the "donut" current transformer, a current transformer in series with the ground circuit in the old unit tripped the breaker on ground current through the use of a residual-ground relay. A potential transformer, connected on the load side of the breaker, furnished power to operate the potential trip coil. In the latest model, this potential transformer is connected on the incoming side of the breaker.

The "donut" current transformer, it is reported, provides better and cheaper fault protection. It is believed that the cable skid with the "donut" current transformer will eliminate the likelihood of a dangerously high potential existing between the unit's enclosure and ground in the event of failure to ground the unit. Detecting an unbalance in the three phase wires rather than relying on a similar



ONE OF THE 12 NEW-MODEL cable-skid switch houses serving the 4,160-volt distribution circuits at Maumee.



VIEW OF SWITCH-HOUSE WIRING showing both the "donut" and conventional-type current transformers.

indication of the trouble in the neutral ground wire—which would be subject to sneak paths—appears to be the logical road to obtaining better system protection.

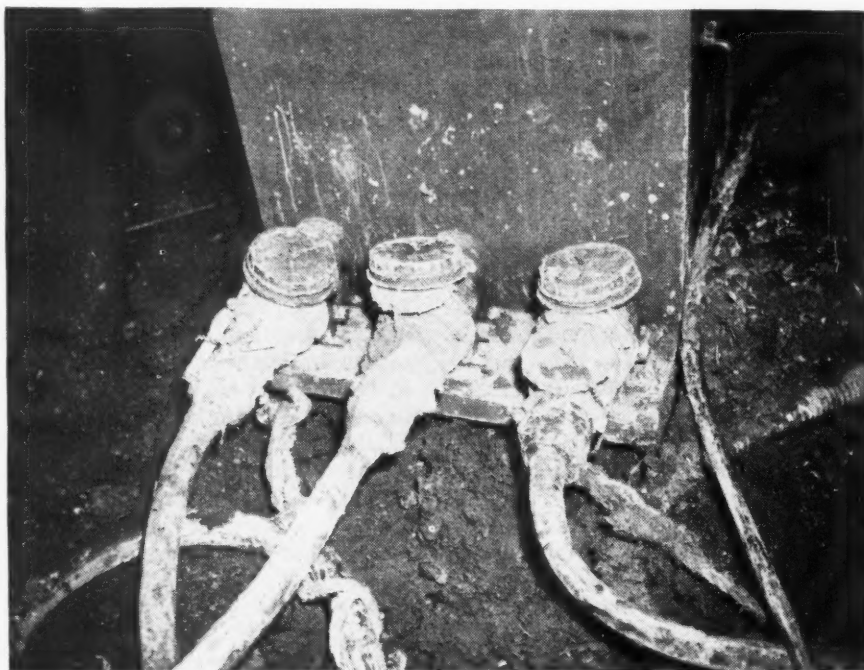
The new model, like the old, has a current transformer in each of the three lines for normal overload protection. By setting the trips on the inverse-time overcurrent relay high enough, the chances of tripping the shovel off the line during periodic overloads are reduced to a minimum. The time setting is 0.3 to 0.4 second, as compared to 0.6 second for the relay at the unit substation, using the same tripping curve. Both the old- and the new-model cable skid have the four-conductor 4/0 coupler sockets mounted in the front for the incoming and through-line connections. The three load outlets at the rear (Fig. 3), protected by a Type FK 142 400-amp. 5,000-volt oil circuit breaker in the enclosure, also are equipped with the four-conductor coupler sockets. The enclosure for the hill- or highwall-type cable skids in service at Maumee measures 40 in. wide, 48 in. deep, 51 in. high in front and 43 in. high in the rear, exclusive of the skids. Each unit weighs approximately 1,600 lb.

The electrical department adheres to the practice of keeping the 33,000-volt connection within a mile of each pit, especially where large stripping units are involved, such as the 1150-B draglines. At Maumee, the cost of constructing a

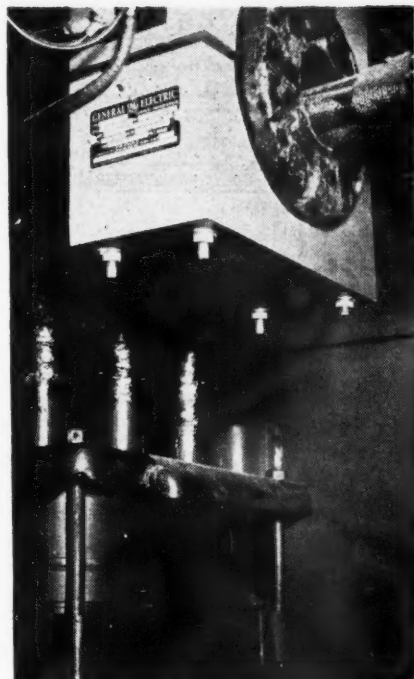
mile of the 33-kv. line is about two-thirds that for the 4,160-volt line. Obviously, keeping the low-voltage circuits short cuts line losses and improves voltage regulation. Lessening the severity of voltage drop, i.e., having good regulation, decreases the likelihood of synchronous drives pulling out of step during periods of heavy overload.

For cross-country construction of the 33-kv. lines, 30-ft. Class IV

and VI fully-treated Southern yellow pine poles are spaced 175 ft. apart. At highway crossings, poles up to 60 ft. in length are used. The pin-type insulators that support the No. 4 medium-hard-drawn solid bare-copper conductors are spaced 4, 6 and 10 ft. on a single crossarm. The average or effective spacing, used in determining the inductive reactance of the circuit, is the cube root of the product of the three



THE THREE CABLES supplying power to the pit equipment are protected by the oil circuit breaker inside the cable skid.



THE "DONUT" current transformer trips the breaker on ground-fault current.

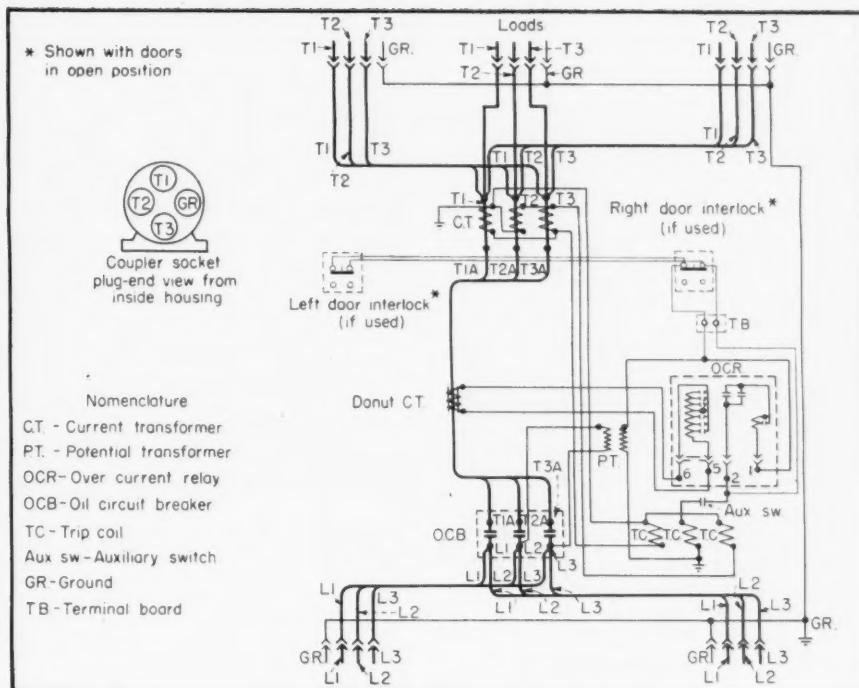


FIG. 2—WIRING DIAGRAM for cable-skid switch house equipped with the "donut" type current transformer for ground-fault protection.

measurements, 6.2 ft. in this case.

The spacing of the 30-ft. poles on the 4,160-volt circuits depends on the size of the conductor used. The span length for the 4/0 copper is 125 to 130 ft.; for 2/0, 140 to 150 ft., and for No. 4, 200 ft. The conductors are spaced 15 in. apart on the same crossarm, with the neutral wire carried on the outside. The effective spacing in this instance is 18.9 in.

No overhead ground wire is carried above the 33-kv. line. However, each pole, on both the high- and low-voltage circuits, has a No. 6 ground wire stapled to it, with a short loop of the wire visible above the top of the pole and the other end attached to a ground plate fastened to the base of the pole.

By consolidating metering points on the 33-kv. circuits at the Riley operation, the company lowered



A CABLE SKID and a 75-kva. bank of transformers stationed near a road. The transformer station supplies 440-volt a.c. power to the churn drills.

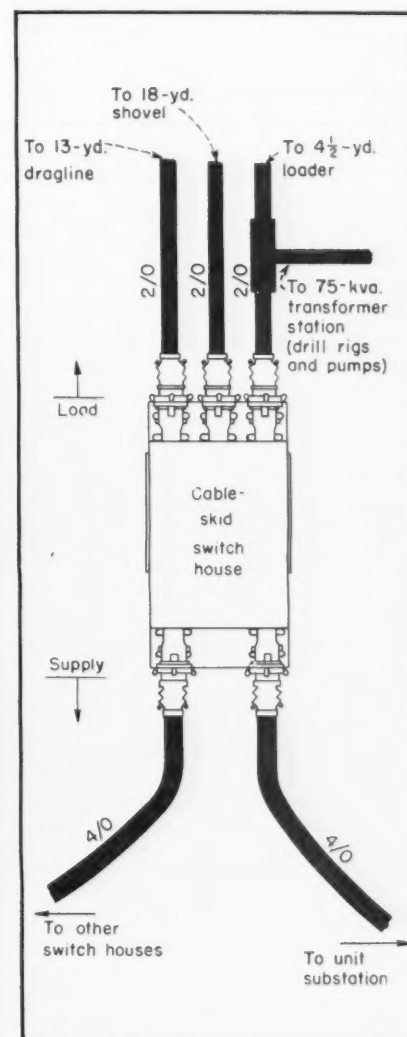


FIG. 3—HOW ONE CABLE SKID is serving the pit equipment at Mine No. 27.

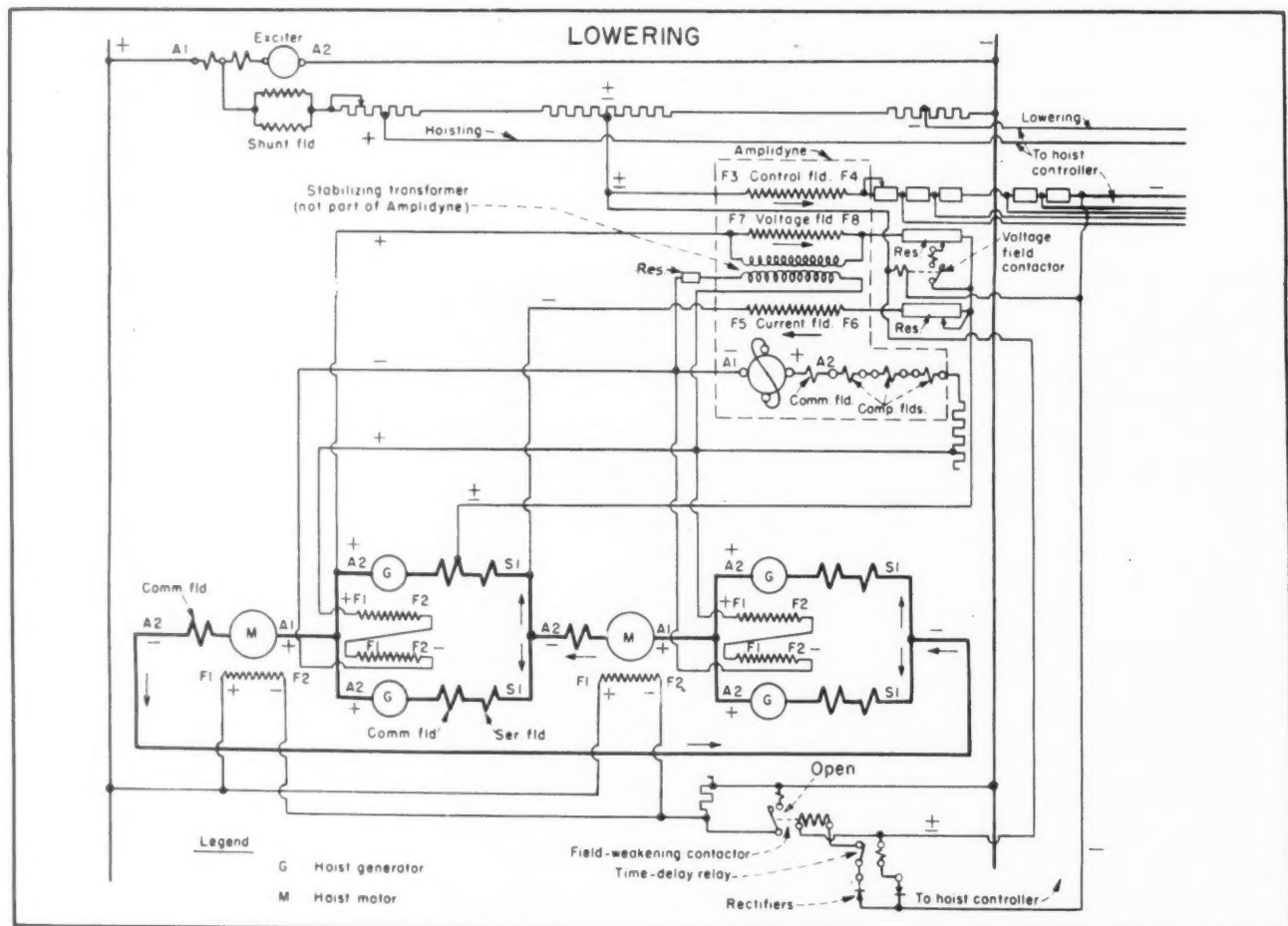
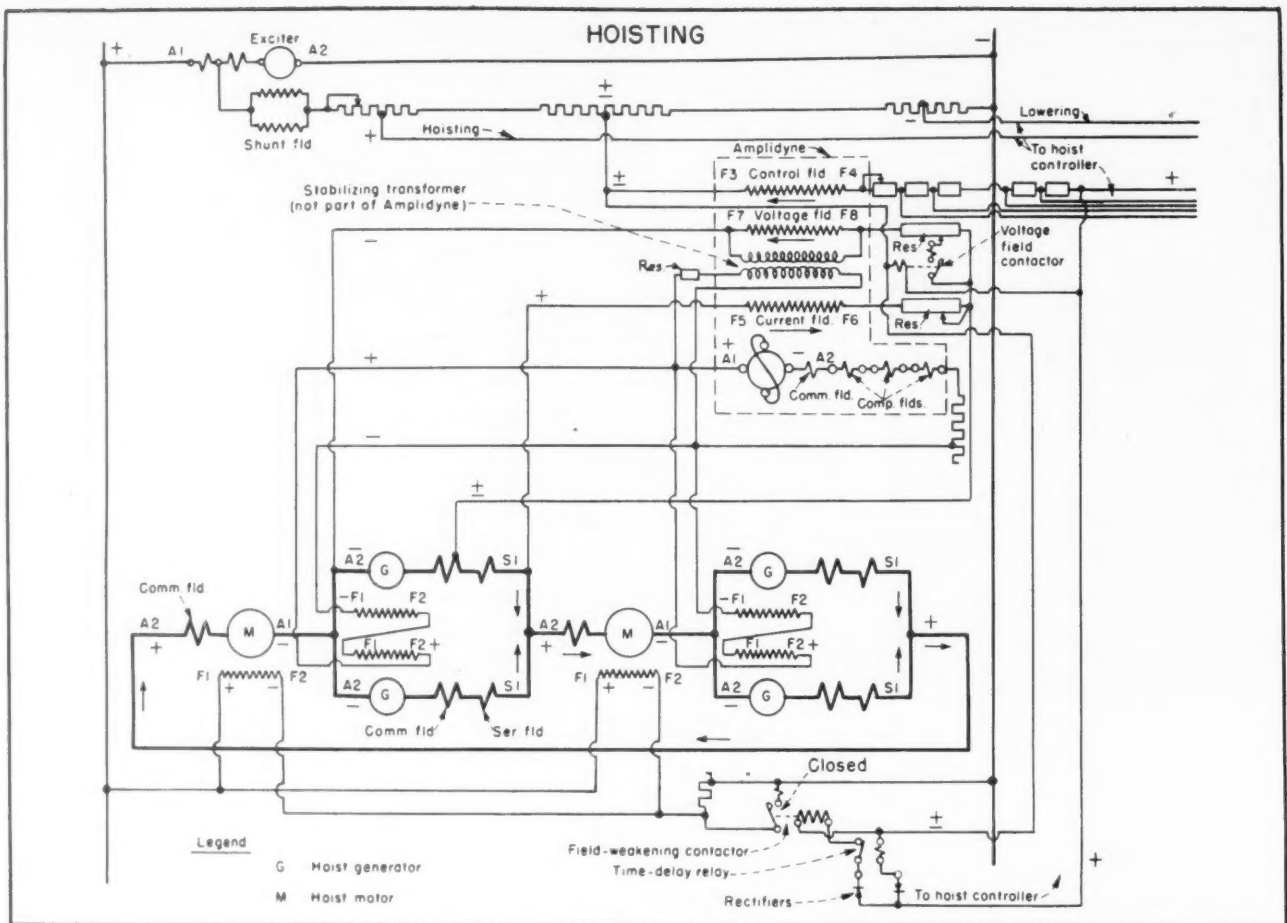


FIG. 4—HOIST MOTORS ON THE DRAGLINE are reversed by reversing the polarity of the field excitation to the Amplidyne. The polarity of the Amplidyne's output voltage depends on the combined results of all three fields.

power costs and improved the voltage, especially at one of the tipples. The next power bill showed that 42,460 more kilowatt-hours were used, yet the power bill was only \$18 more than the previous month. The demand had dropped from 897.6 kw. to 719.8, and the over-all power factor was improved.

Maumee has 35,000 to 40,000 ft. of portable cable in service at the various pit operations. Most of it is General Electric Type SH Class D cable. This cable has shields on the individual conductors, for both safety and corona protection, and ground wires in the interstices. The inner jacket is made of 40-percent Geoprene and the outer jacket of 60-percent Geoprene. Judging from the size of the electrical maintenance and construction crew (13 men for all the mines), relatively little cable trouble is encountered. This results, in part, from careful handling of the cable in the pits. Before dragging the cable, a rope sling is wrapped around it a distance of 3 or 4 ft. by criss-crossing first underneath and then over the top of the cable. This eliminates the bruising of the jacket and the kinking of the cable.

Circuits Changed on Dragline

Two important changes have been made in the electrical circuits of the 25-cu.yd. Bucyrus-Erie 4,160-volt dragline at Maumee. One change relates to the swing motion and involves the circuit arrangement of the three swing generators and three swing motors. The latest revision to this circuit permits each swing motor to be powered from a separate generator. This change was made to prevent overspeeding of a swing motor in the event of a broken pinion shaft.

In the old circuit, where three generators and three shunt motors were alternately connected in series, a motor could "explode" from overspeed if the pinion shaft twisted in two. The reason was that, although the motor's load was reduced to zero, a high current continued to flow through its armature and commutating field, since it was in series with the other motors and generators still attempting to swing the dragline. As a result of this unusual condition, the shunt field was unable to hold the speed of the motor in check.

The addition of a stabilizing transformer to each of the Amplidyne circuits—hoist, swing and drag—has made possible further control refinements in dragline op-

eration. Should the operator open the controller too rapidly, either for the purpose of accelerating or plugging, the stabilizing transformer serves to cushion the effect of such action on the dragline equipment. Thus, in place of supplying the generator field with a steeply-rising excitation voltage, there is substituted a voltage cushioned by virtue of a feed-back tie (stabilizing transformer) between the Amplidyne's armature and F7-F8 field winding. The current in the F7-F8 field (Fig. 4), except for the momentary influence of the stabilizing transformer, is proportional to the terminal voltage of the generator.

Amplidyne Vs. Other Exciters

A small control field, a short-circuited armature and a compensating (load-axis) winding differentiate the Amplidyne from the older and better understood types of exciters. These fundamental physical differences account for the high-amplification and quick-response characteristics generally associated with the Amplidyne or regulating exciter.

The Amplidyne is essentially a two-stage amplifier. The first stage of amplification is from a small control field to a set of short-circuited brushes. The second stage is from the short-circuited brushes to another set of brushes, termed the load brushes. To begin with, a small current in the main or control field, operating only on the straight portion of the magnetizing (saturation) curve, produces a small flux that induces a low voltage in the generator armature of the motor-driven Amplidyne. Short circuiting this low voltage with a jumper between one set of brushes causes a large short-circuit current to flow in the armature, producing a large flux. This flux is used to induce the normal voltage that is applied to the load (in Fig. 4, the separately-excited shunt fields of the hoist generators) connected across the other set of brushes of the Amplidyne.

The stator of the Amplidyne usually contains from one to four control fields, a short-circuit-axis series winding, a load-axis compensating winding and a load-axis commutating winding. The load-axis compensating-field winding is designed to neutralize the load-current armature flux. The amplification factor for the Amplidyne, defined as the ratio of output volt-amperes to the input volt-amperes, is approximately 10,000 to 1 as

compared to 100 to 1 for the conventional exciter.

The hoist circuit shown in Fig. 4, for hoisting and lowering, is an illustration of an adjustable-voltage system in which the reversal of the hoist motors is initiated through a reversal of the field polarity in the Amplidyne generator. Such an adjustable voltage system is well suited to the closed-cycle control operation since the Amplidyne combines several control functions. The hoist motor's speed-torque performance is best gaged from the four-quadrant chart in which the conventional quadrants, I to IV, are labeled as follows: (1) forward motoring; (2) forward plugging; (3) reverse motoring; and (4) reverse plugging. In connection with this type of chart for closed-cycle control operation, the Amplidyne is credited with providing extra power during motoring, and also load limiting protection, without overshooting, during stalling or plugging.

Closed-Cycle System Used

In a closed-cycle control system, a standard is established—in this instance, generator voltage (F7-F8), which determines the operating quantity to be maintained. Against this standard is balanced a signal which measures the actual operating quantity—in this case, the armature current or torque (F5-F6). A deviation of the actual operating quantity from the standard initiates a corrective action designed to minimize the deviation from the standard. Thus, in Fig. 4, the reference field (F3-F4) pushes the load to the limit. The current field (F5-F6) is effective during acceleration, deceleration, plugging and stalling. The voltage field (F7-F8) is in control when the load is below the current limit.

Current flowing from the lower to the higher numbered subscript of any of the Amplidyne's control fields produces flux in a direction which tends to make the short-circuited armature's A2 terminal positive. Thus, current flowing from F3 to F4 will tend to make A2 positive, but current flowing from F8 to F7 would tend to make A1 positive. The expression "tend to make positive" should be noted because the actual polarity of the Amplidyne depends upon the net, or combined, result of all the control fields.

Since the speed of a d.c. motor is inversely proportional to the effective flux, the speed of a shunt motor can be increased by weakening

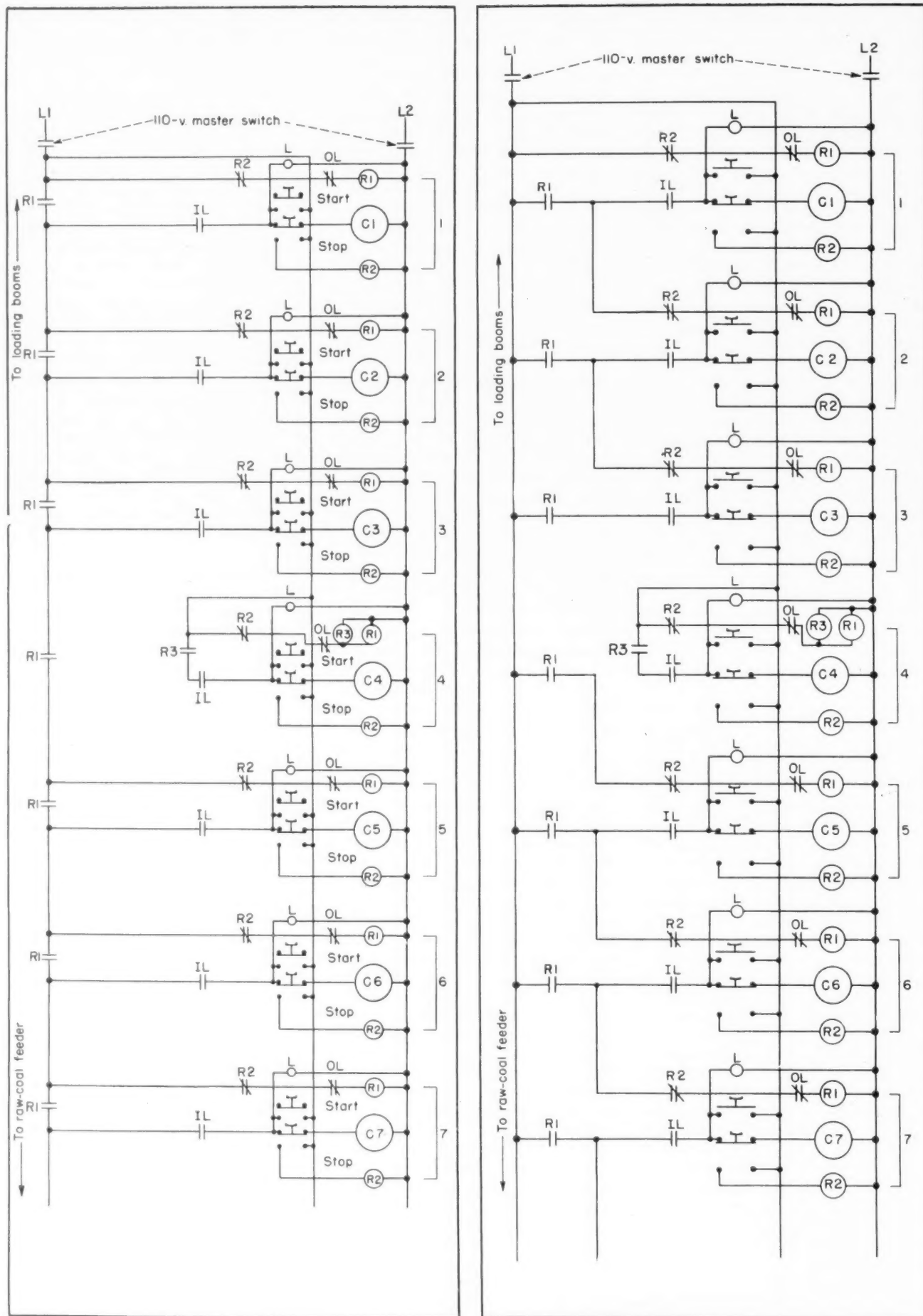
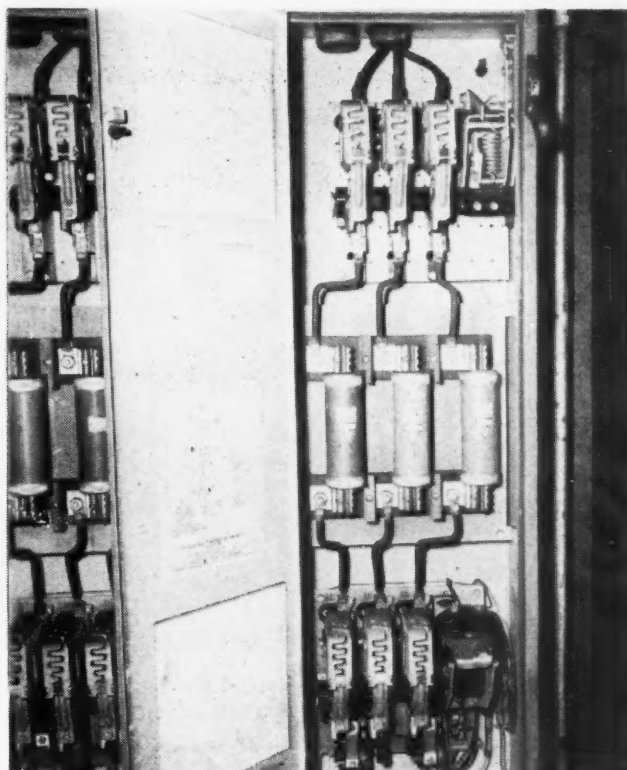


FIG. 5—TIPLE CONTROL LAYOUTS in which special bypass protection is incorporated. The latest revision (right) permits the use of a 10-amp. sealed plug-in-type relay for Relay R1.



TWO SMALL RELAYS, mounted in lower right-hand corner of starter box, were added for sequence protection in preparation plants. The control voltage is 110, but motors use 440 volts.



PART OF A NEW STARTER INSTALLATION in a preparation plant being rewired. Only heater- or resistance-type thermal overload relays are specified on requisitions for new starters.

its shunt-field current. Field weakening, in the case of the shunt motor (not to be confused with the term of field shunting used for increasing the running speed of series motors in electric railway service), is accomplished by inserting resistance in series with the shunt field. Since motor torque varies directly and speed inversely with the flux, a sacrifice in available torque must accompany any rise in speed above the full-load speed.

Field weakening is used in two circuits to speed up the dragline's operating cycle: (1) hoist-lowering motion and (2) drag paying-out motion. The extra equipment necessary for field weakening includes a field resistor, field contactor, time-delay relay and two copper-oxide rectifiers. The field-weakening operation is automatic, subject to the movement of the controller handle. The rectifiers permit the field-contactor coil to be energized only under the right condition of circuit polarity. The field contactor, if energized, short-circuits the field weakening resistor; if deenergized, the field weakening resistor is inserted in the circuit and the shunt motors operate at a higher speed. The time-delay relay introduces a slight delay in the application of field weakening so that full torque is available as the initiating force

for reversing the rope drums. Field weakening permits the motors to operate, in this instance, at twice their normal full-load speed. The fact that the available torque is reduced by one-half is not a serious matter since the dragline bucket is empty.

Maumee uses its company-styled system of control sequence in the tipples. Mr. Bennington worked it out during a stay in the hospital several years ago. The scheme, illustrated in Fig. 5, uses 110-volt 60-cycle power and employs two additional relays in each starter to give it advantages not found in the ordinary tipple control system.

Starters Have Special Relays

Two Series 110 Guardian relays, similar to the ones used in juke boxes and pin-ball machines, are wired in each starter circuit. Relay R1 is a four-pole unit with normally-open contacts that will accommodate an inductive load of 40 amp. at 110 volts. R2 is a single-pole unit with normally-closed contacts, capable of handling as much as 10 amp.

Like most tipple-control layouts, this one calls for starting the loading booms first and then working back to the raw-coal feeder. The start button for each unit must be

depressed in the proper order. Indicating lamps show at all times which units are in operation. The usual provision for stopping all motors ahead of any motor that encounters trouble also is incorporated in this system and is accomplished through Relay R1.

The unusual aspects of this control system are associated with the stop button. Depressing the stop button enough to open the third set of contacts deenergizes the holding coil of the associated starter and stops only the one motor. This feature facilitates, for example, the changing of cars under a loading boom when it is desirable to stop a unit momentarily but where the job does not warrant stopping the entire tipple.

When it is necessary to stop a unit and also the other units ahead of it, the stop button must be depressed all the way. In this instance, Relay R2 is energized and its normally-closed contacts open to deenergize Relay R1. R1 opens to deenergize that starter's holding coil and those of the other starters for the units ahead of this point in the flow circuit.

Tipples often get into trouble when the flow of coal is interrupted under abnormal conditions. For example, a crusher or a centrifugal drier should not be stopped before



Evans Bennington (right), superintendent of electrical maintenance, and Carl Hineman, foreman of electrical construction.

Maumee Operating Personnel

O. S. Roberts, President, Toledo, Ohio

Operating Office, Terre Haute, Ind.

Hugh B. Lee, Vice President and General Manager

David W. Aten, Vice President and Secretary

Lafe Stewart, Mining Engineer

Robert Akre, Blasting Engineer

George W. Rea, General Superintendent

Floyd Jackson, Assistant General Superintendent

Central Shop, Jasonville, Ind.

Earl Spainhower, Master Mechanic

Warren Miller, Shop Foreman

Joe Burcham, Superintendent of Automotive Maintenance

John Winters, Yard Foreman

Earl Winters, Superintendent of Shovel Maintenance

Loyd Brown, Tipple Construction Engineer

Sylvester Hadley, Carpenter Foreman

Evans Bennington, Superintendent of Electrical Maintenance

Burt Seever, Supply Clerk

Carl Hineman, Foreman of Electrical Construction

Mine No. 20, Riley, Ind.

E. A. Brinton, Superintendent

John O'Hern, Pit Foreman

Nelson Niccoson, Chief Electrician

Mine No. 17, Clay City, Ind.

Perry Haviland, Superintendent

Arthur Kelley, Pit Foreman

Marshall Engle, Chief Electrician

Mine No. 28, Jasonville, Ind.

Oscar Wolf, Superintendent

H. A. Wonders, Pit Foreman

Frank Bledsoe, Chief Electrician

Mine Nos. 23, 27 and 30, Dugger, Ind.

Harvey Grounds, Superintendent

Lowell Workman, Pit Foreman

Earl Grounds, Pit Foreman (No. 30)

the unit is out of coal. Maumee takes care of this condition by adding another relay, R3, as in the case of No. 4 unit, Fig. 5. None of the essential protective features are sacrificed, yet the crusher or other unit cannot be stopped unnecessarily since it is divorced from the first order of the control sequence.

In the matter of maintenance, the burning out of one of the small relay coils causes no real inconvenience. The armature of Relay R1 can be blocked mechanically and the operation of the starter resumed. At present, the electrical department is searching for a sealed-tube relay with a radio plug-in-type base that could be mounted on the cover of the starter. This would simplify the replacement of a damaged relay.

All motors are controlled from the main control center in the tipple. There are no auxiliary push-button stations located near the

motor, even for test purposes. All signals are relayed to the control board through an Edwards 20-drop 16-volt a.c. annunciator unit, employing a No. 8 gong. One ring is the signal to stop, two rings the signal to start.

Good Controls—Fewer Delays

The electrical department at Maumee uses General Electric equipment in modernizing old control circuits in tipples. From experience it has found that a good control job means fewer tipple delays. The No. 28 tipple has not lost half a shift from control trouble in nine years of operation. Fuses are specified for short-circuit protection in each starter and clamp-tight connections are used. For straight overload protection, the specifications call for the heater- or resistance-type thermal overload relays.

The heater-type thermal relay contains a resistor through which the motor current flows. The heat generated in the resistor element is radiated, and to a limited extent conducted and convected, to a bi-metal strip. The bi-metal strip forms a cantilever inside the resistance element. When the strip is deflected sufficiently, a trip lever is released upward, causing a horizontal bar to turn and to open the relay contact. By interchanging heaters of various sizes the relay can be used for motors of different full-load currents. After the bi-metal strips have cooled, the relay may be reset and the motor started again. The tripping characteristics of this relay are known to be reliable.

Two 5,000-watt 440-volt immersion-type Calrod heaters are used to regulate the temperature of the oil in the oil-treating units on the loading booms at the tipples.

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Battery powered haulage units and EXIDE-IRONCLAD® BATTERIES Teamed to increase tonnage...reduce haulage costs

The steady, uninterrupted service of battery powered haulage units brings increased tonnage...cuts haulage costs. That's why so many battery powered locomotives, trammers and shuttle cars are being used in modern high-production mining operations. And you can be sure of full-shift availability when Exide-Ironclad Batteries supply the power!

That's because Exide-Ironclad Batteries have *all* four of these vital characteristics of a storage battery—high power ability, high electrical efficiency, ruggedness and long life... assuring years of safe, dependable day-in, day-out mine haulage service.

1888... Dependable Batteries for 60 Years... 1948

If you have a special battery problem, or wish more detailed information, write...

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto



The Foremen's Forum

Slip-Ring Motor Speed-Torque Depends on Resistor Steps

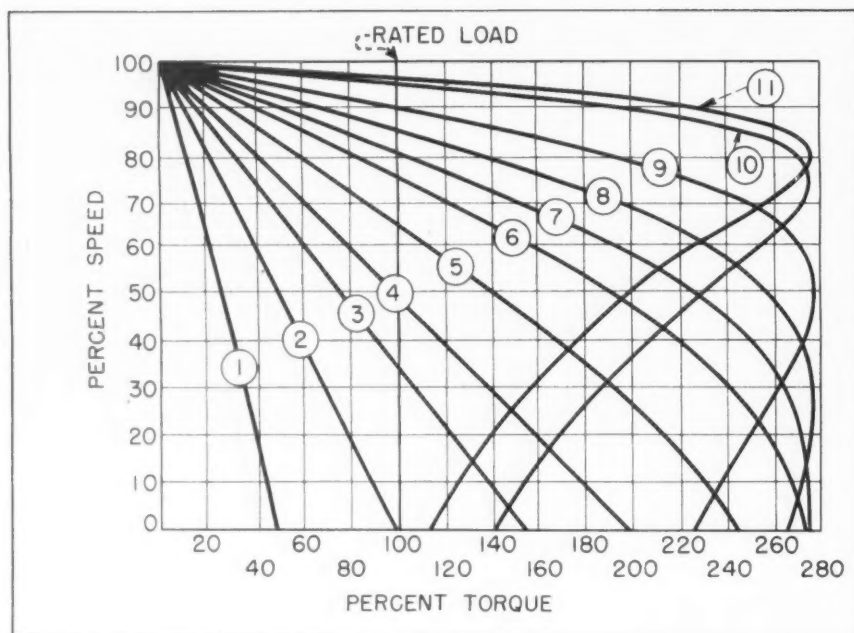


FIG. 1—A FAMILY of speed-torque curves for a typical slip-ring induction motor.

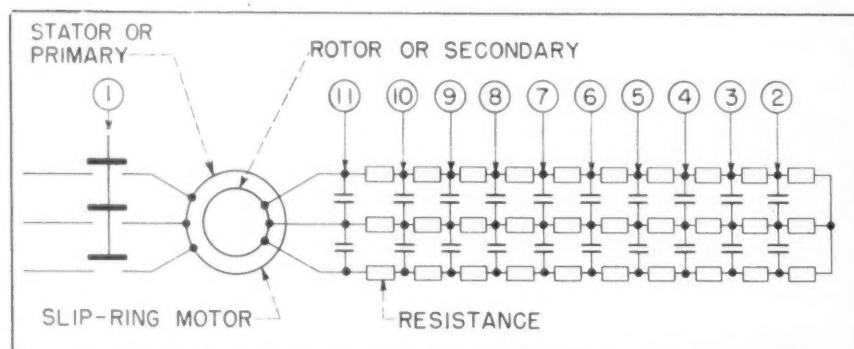


FIG. 2—WIRING DIAGRAM for an eleven-position controller for varying the speed and torque of a slip-ring motor.

SQUIRREL-CAGE and wound-rotor (slip-ring) a.c. induction motors are very common around preparation plants. The speed-torque characteristics of the squirrel-cage motor, except in instances where the windings may be re-grouped for pole-changing purposes, are fixed by the

design of the motor. Once built, its speed becomes a function of the mechanical load to which it is coupled and its starting torque cannot be varied at will. The speed-torque characteristics of the wound-rotor type, however, can be altered through the use of external resistance con-

nected to the rotor's three slip rings.

The family of speed-torque curves shown in Fig. 1 fit a typical slip-ring motor in which the resistance of the secondary or rotor circuit is varied through the manipulation of the eleven switches or contactors shown in Fig. 2. The instant Switch No. 1 is closed (the only switch shown in the primary or stator circuit) the motor can attempt a start. However, if it is connected to a fully-loaded shaker screen or drag conveyor, it may not start on the first point or two because of insufficient torque. By notching the controller ahead, one point at a time, the motor will, if suited for the duty, develop enough torque on a subsequent point to "roll the load."

Motor's Job to Accelerate Load

If, for example, the controller handle is left on Point No. 5, the motor and drive will attempt to accelerate according to Curve No. 5. The ultimate speed will be determined by the torque demand of the load. At rated load (100 percent) the final speed will be about 65 percent of the synchronous or light-load speed. If the motor is overloaded the final speed will be even lower. Granting that the motor is able to accelerate the load to the $\frac{2}{3}$ -speed mark, at this speed the motor will, more than likely, be throttling the capacity of the plant.

Under some circumstances it is possible that the motor would be able to start on the fifth point but would not be capable of accelerating the load. The next move, obviously, would be to keep notching the controller ahead, point by point. From the curves in Fig. 1, Point No. 7 provides maximum torque at stand-still or zero speed. In this instance maximum torque is about 275 percent of the full-load torque. But as the motor begins to accelerate, less torque is available. However, as the motor speed increases the maximum value of torque is again available on the remaining points of the controller. To take advantage of the highest torque available for quickly accelerating a heavy load the controller should be notched up gradually to Point No. 11. On Point 11 all the external resistance is shorted out of the rotor circuit and the motor operates along the upper speed-torque curve.

When the maximum or pull-out torque (275 percent in the case just

MINE LUBRICANTS

MARATHON

ALL OPERATIONS



BETTER MINE LUBRICATION ... WITH $\frac{1}{3}$ TO $\frac{2}{3}$ FEWER LUBRICANTS?...

Not unusual at all—when mines change to
MARATHON MULTI-PURPOSE LUBRICANTS

Simplify your lubrication job. Have fewer lubricants to stock, handle and account for! Reduce the chance of error. Many leading strip mines have found that 10 to 12 Marathon Multi-Purpose Lubricants are doing the job that used to call for 15 or 20 specialized lubricants. In shaft mines,

4 or 5 Marathon *Multi-Purpose* lubricants are doing a *better* job than 10 or 15 specialized lubricants formerly did. Worth investigating, isn't it? Write, wire or phone—ask for a Marathon Mine Lubrication Engineer to call and work out a complete maintenance program.

A COMPLETE LINE OF MARATHON LUBRICANTS FOR
EVERY OPERATION IN YOUR SHAFT OR STRIP MINE



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cited) is exceeded the speed of the slip-ring motor drops abruptly and, unless the torque requirements decrease, continues to decrease until zero speed is reached. Likewise, if a motor is too small to do the job, it will not be able to start a given load. This is true of some slip-ring hoist motors that are used at men and material shafts. They were, in the beginning, suited to the task of perhaps hoisting the development coal a car at a time. But later, when bad roof conditions were encountered and it became necessary to hoist and dispose of large quantities of rock, the motor was found to be too small to hoist the car filled with the heavier material. It meant loading the cars lighter if the same hoist motor was to be used.

Runs Below Synchronous Speed

The only time that the speed of an induction motor approaches "synchronous" speed is at no load. When the motor is loaded its speed is less than synchronous speed. This difference in speed is termed the "slip" of the motor. The curves in Fig. 1 show that this slip in speed is dependent upon the external resistance in the secondary circuit. For a given torque, the slip increases and the speed decreases as the external resistance in the secondary circuit is increased. Thus with a slip-ring motor, various operating speeds are possible, depending upon the setting of the controller and the torque demanded by the load. The speed, however, will change with the torque, and for that reason the motor is called a varying-speed motor.

It is not considered good practice to attempt to operate a slip-ring motor below half speed at full load because the slope of the speed-torque curves at greater speed reductions becomes too steep, and slight variations in torque cause undesirably high changes in speed.

Like other motors, the slip-ring motor performs best on good voltage. Its torque is proportional to the square of the voltage supplied to the stator circuit. If the voltage of the power supply is only 90 percent of normal, the motor will develop only 81 percent of its maximum or pull-out torque. Few drives in the preparation plant can afford the penalty of bad voltage, especially in the winter months when cold weather imposes an additional burden.

Changing the taps on the primary side of the tiddle transformers will improve the voltage on the distribution circuits to the motors. Capacitors also will help. However, they accomplish more in the way of voltage regulation if they are located near the terminals of the motor. While capacitors are improving the voltage at the motor they also are improving the power factor of the system. Capacitors often pay for themselves through reduction in system losses.

How Are You on Ventilation?

This quiz is designed to help you in your supervisory work. Study the questions, check "Yes" or "No" and then see below for explanation.

1. Can you write down this minute the requirements of the federal safety code and your state law for minimum air quantities, both as to men working and methane percentage in the return? Yes ☐ No ☐
2. Are your working places usually hot, dusty and smoky? Yes ☐ No ☐
3. Do you carry air from pillar lines, old workings and seals through live workings? Yes ☐ No ☐
4. Do you keep air traveling from section to section as long as possible? Yes ☐ No ☐
5. Do you ever check to see what percentage of the air entering a section or territory reaches the last crosscut? Yes ☐ No ☐
6. Do you bother with falls, crooked headings, rough ribs and tight places? Yes ☐ No ☐
7. Do you prefer doors and nothing else? Yes ☐ No ☐
8. Do you ever check a stopping after it is built? Yes ☐ No ☐
9. Do you always bring air back to its starting point? Yes ☐ No ☐
10. Do you know how much doubling air velocity affects fan horsepower? Yes ☐ No ☐

"Yes" should be answers to Questions 1, 5, 6, 8 and 10; "No" to all the others. The reasons are:

1. Like everything else, good ventilation depends upon accurate knowledge of what is necessary and the starting point is the safety code and the law. If there is any doubt about minimum requirements, then the chance of making mistakes is enhanced. With an accurate knowledge of requirements from the legal standpoint and from the conditions peculiar to the mine, it is possible to plan not only general but also section-by-section ventilation for desired results.

2. Clear, cool working places free from clouds of dust are a good sign that ventilation is doing its job. After all, the object of ventilation is good air at the face. Check doors, curtains and brattice lines, make certain that the air gets to the place it is intended for.

3. Fresh air at the working place and dilution of explosive and noxious gases to a point where they are rendered harmless are the main objectives in mine ventilation. Using air from old workings, pillar sections and seals means the introduction of both explosion and health hazards.

4. "Continuous" ventilation means not only increasing the explosion and health hazards but also, in many instances, excessive use of power. Proper splitting is the answer. It not only assures fresh air but also results in a real power saving.

5. Loss of air before it reaches the working places is one of the major causes of increased ventilation cost. If a substantial portion never reaches the last crosscut, it is a signal that something should be done to correct a

situation not only costly but perhaps dangerous.

6. Turbulence and airway constrictions mean extra power. Low-cost ventilation always follows the driving of straight, smooth airways without narrow places or abrupt turns. Good timbering and regular cleaning back up the original savings and keep power cost low.

7. Doors are necessary in places but they are among the greatest of air-wasters. Splitting and the use of overcasts should be the practice wherever possible. When doors must be used, they should be well built, tight and kept closed. Double doors to form airlocks are preferable and are required in many instances.

8. Air waste means power waste. Leaky stoppings or stoppings constructed of poor materials have been known to waste up to half or more of the air put into a mine. Regular examination of stoppings, backed up by repairs as necessary, result in better ventilation with less air. Naturally, the original material should be fireproof and leakproof.

9. The farther air is traveled, the more power that is required. After air has done its work, it should be discharged outside as soon as possible, meaning that auxiliary openings to cut air travel should be made at the back of the mine where possible.

10. Eight times the original horsepower is required when air velocity is doubled. A major factor in low-cost ventilation, therefore, is providing plenty of airway area at the start and then making sure that it is maintained by cleaning and conditioning as necessary.

you get more work out of Mack Trucks



Built-in durability plus exclusive features of design explain the stand-out performance of Mack super-duty trucks on punishing coal stripping operations. Mack Model LR, specially engineered for this service, is proving to cost-conscious mining men that a Mack on the job means more work done on the job.

because...we put more work into Macks



Mack trucks for off-highway service take the toughest terrain in stride. Whether it's uneven ground, slippery mud or sand, Mack's exclusive Power Divider assures good going by effectively transferring power to the wheel having the best traction. Two distinct types of the Power Divider are available, one for four-wheel trucks (shown here) and another for six-wheelers.



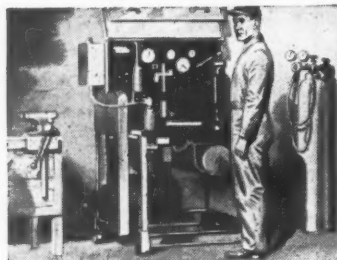
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trucks for every purpose

Mack Trucks, Inc., Empire State Building, New York 1,
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New Brunswick, N. J.; Long Island City, N. Y. Factory
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SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK



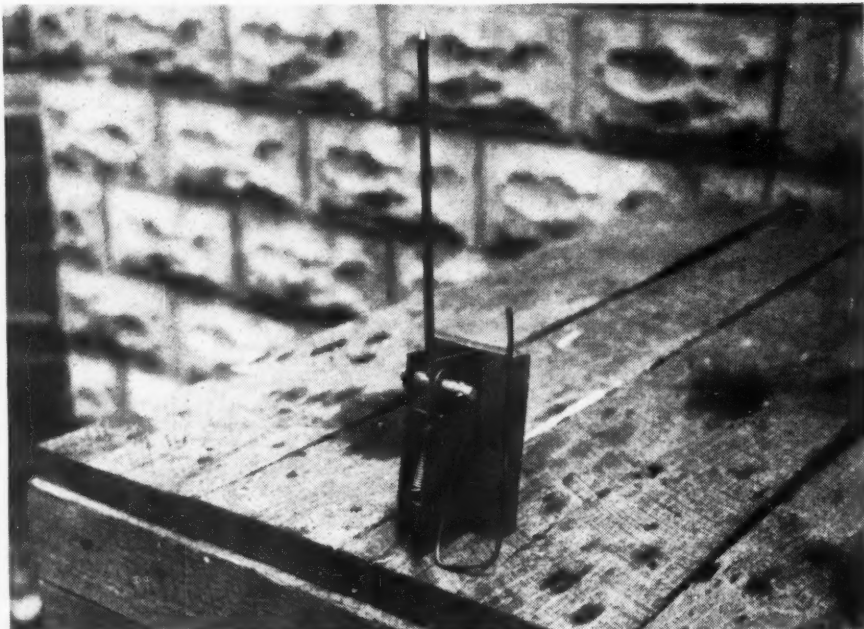
Operating Ideas

Derailment or Bent Pans Actuate Fingers to Stop Conveyor

TO PREVENT SEVERE DAMAGE in case of derailment of a long slope conveyor of the apron type at the Dabney No. 8 mine of the Hutchinson Coal Co., Logan County, West Virginia, 20 electrical fingers have been installed underneath the carrying run. Normally the clearance between the pans and the upper ends of the fingers is 1 in. If the rollers come off the track or a pan is bent, the conveyor no longer clears the fingers and rubs against one or more of them, thus actuating the electrical controls to stop the conveyor.

This conveyor, which has been in use for many years and is difficult to maintain in first class operating condition, is 52 in. wide and 350 ft. long between centers. A break in the line, which might be caused by a derailment and consequent fouling at the sprockets, can cause a pile up, doing considerable damage, delaying production for many hours and requiring a great deal of clean-up and repair labor.

As shown in the accompanying photograph taken at the main shop at MacBeth mine, where the electrical contact fingers were made under the direction of C. E. Stinnette, chief electrician, Logan Division, the whole mechanism is mounted on an insulating fiber-block base. The pointed contact finger made from brass rod



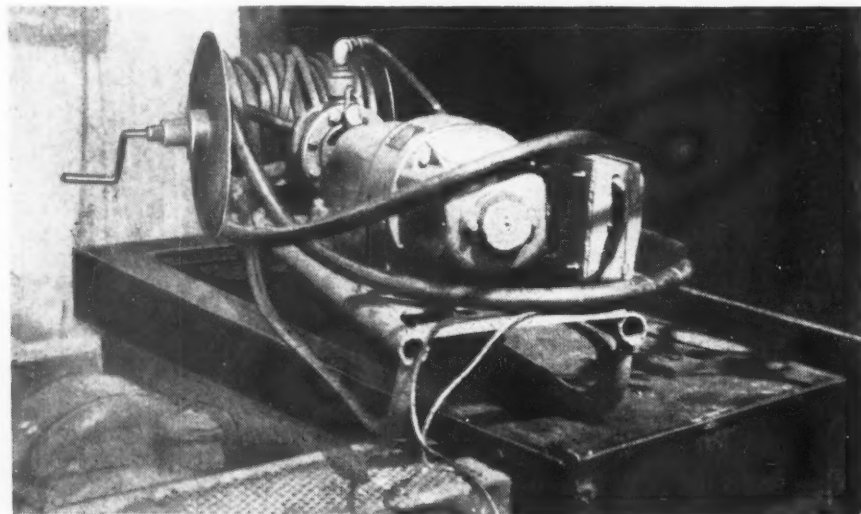
CONVEYOR-CONTROL FINGER is insulated from the conveyor framework by a fiber-board mounting base. The bent wire is an insulated lead for connection to the control bus.

is pivoted and is kept in a vertical position by a tension-type coil spring that permits the finger to be deflected when the bottom of a conveyor pan drags over it.

Contact between the end of the

finger and the pan grounds the finger and thereby shorts out a relay that stops the 75-hp. driving motor. One side of the 110-volt control circuit is permanently grounded to the conveyor track.

Emergency Fire-Fighting Pump Easily Moved



THIS PORTABLE PUMP, complete with a hose on reel, was designed and built at the shop of No. 15 mine of the West Virginia Coal & Coke Corp., Stirrat, W. Va., for emergency fire-fighting use. The unit includes a standard water-box pump and motor, such as that used on spray units, together with a reel for coiling the hose. It is mounted on skids so that it may be taken to any part of the mine as necessary.

PORTABLE fire-fighting pump is mounted on skids for use in any part of the mine.

Memo from our RAW MATERIALS DEPT.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION OFFICE MEMORANDUM

DATE 8/11/48

TO: Metallurgical Dep't.

SUBJECT: Performance of Heat Treated JALLOY Steel
at Benson Mines, Star Lake, N. Y.

1" x 6" heat-treated JALLOY #3 flats to reinforce truck-body bottoms and doors. Service—severe impact loading of hard rock magnetite ore from 5-yd. shovel. Year round operations in temperatures to minus 47°F. Severe abrasion in unloading. Installations have been in service 13 months—305,000 tons handled per truck. Units equipped with these flats maintain bottom flatness and clean readily. Insignificant wear at this date indicates at least 2 years life before replacement is necessary.

WHAT better "laboratory" could we find to prove the qualities of J&L Steel than in the equipment required in our own operations?

The handling and moving of heavy, abrasive ore-bearing rock, at our Benson Mines, is a rugged test for any equipment. Yet our stone trucks equipped with heat-treated J&L JALLOY Steel reinforcing strips have run *more than a year* without bottom replacements. *And recent reports indicate at least two years life!*

These JALLOY strips receive the full impact of huge rocks *dropped* into the truck bodies, and withstand the abrasion caused by dumping load after load. This continuous resistance to shock is particularly noteworthy because of the embrittling effect of the sub-zero temperatures encountered during winter months.

J&L JALLOY is a fine-grain, heat-treated steel made in a wide range of physical properties with tensile strengths of 155,000 to 180,000 lbs. per sq. inch. Its inherent ability to withstand shock and abrasion adds life to equipment that must be tough and strong—such as: Rock crushers, Scrapers, Bulldozers, Dump cars, Power-shovel buckets, Truck bodies, Sandblasting equipment—or wherever abrasion and impact are limiting factors.

Manufacturers of trucks and trailers designed for heavy service will find JALLOY an excellent material for body bottoms, reinforcing strips exposed to severe abrasion, tail gates and many other applications. You'll find that JALLOY is a steel that stands up when the going gets tough. For more complete information, let us send you the booklet: "Jalloy—J&L Alloy Steel." It includes data on properties, heat treatments and workability. The coupon at the right is for your convenience.



Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
Pittsburgh 19, Pennsylvania

Please send me your booklet:
"Jalloy—J&L Alloy Steel."

Name _____ Title _____

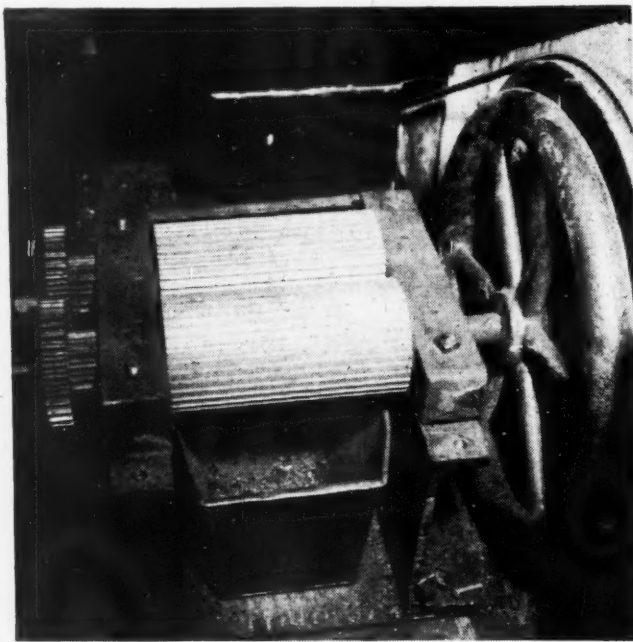
Address _____

JONES & LAUGHLIN STEEL CORPORATION

Primary Crusher Facilitates Sampling



WILLIAM WILSON, head colliery inspector, grinds a 10-lb. sample of No. 1 buckwheat prior to the burning of the sample for ash.



HOW THE ROLLS appear after the removal of the hood. Notches on rolls have both steep and sloping walls.



USING THE HAND-OPERATED rocker-type crusher was a slow and laborious operation that did not provide uniform samples.

A SHOP-BUILT MOTORIZED primary grinder has replaced the antiquated hand-operated rocker-type crusher at Loree, facilitating the recovery of a more uniform quartering sample, states William Wilson, head colliery inspector, Loree colliery, The Hudson Coal Co., Luzerne County, Plymouth, Pa.

The grinder or crusher, shown in the accompanying illustration, is used to crush the 10-lb. samples of pea and buckwheat before the samples are quartered, pulverized and burned for ash. The rolls, $3\frac{1}{2}$ in. in diameter and 8 in. long, are geared together and the notches on their peripheries match as the rolls roll around. The leading wall of each notch is quite steep while the trailing wall is very sloping. This facilitates the feeding of the coal into the rolls. The rolls, originally hand-driven, are powered by a $\frac{1}{4}$ -hp. motor and rotate at 172 r.p.m.

Mr. Wilson says reduction of the samples by the motor-driven crusher is many times faster than using the hand-operated device (also shown among the accompanying illustrations), and that the samples are more uniform and the test results more consistent.

Hard-Facing Churn-Drill Bits

CHURN-DRILL BITS used in underground drilling operations at Saint Anthony Mining & Development Co., Ltd., according to *Engineering & Mining Journal*, are hard-faced with Stoodly self-hardening rod as shown in the accompanying photograph submitted by Earl Snodgrass, master mechanic. For very hard ground Borium welding rods are used. Time required to dress one bit is about one hour.

The chief advantage for hard-facing bits is that it is speedier and requires less handling of bits than conventional sharpening methods. The work is done in the machine shop, but it is quite possible to have the arc-welding equipment right at the drill site.

Hard-faced bits have drilled as much as 10 ft. in fresh granite, and 2 to 3 ft. in a hard glassy rhyolite on the property. Loss of gage must be carefully watched during the drilling of longer runs.



CUT COAL MINING COSTS

...with bigger cars... *built of U·S·S COR-TEN*
that do more, last longer, cost less to operate

AUTHORITIES agree that big cars which permit full utilization of loading machine capacity—that reduce the number of trips necessary—and that save in lubricants, repairs and man-power needed, are definite aids to greater efficiency and lower costs.

U·S·S COR-TEN provides the ideal construction for large capacity cars. It permits increase in size with the

least increase in weight. It insures unusual strength and toughness. It insures high resistance to corrosive conditions. It gives maximum ability to withstand hard knocks and abuse.

And here is why. When you build with U·S·S COR-TEN you're using a steel that has a yield point $1\frac{1}{2}$ times that of structural carbon steel—that has greater impact strength and abrasion resistance—and that is 4 to

6 times more resistant to attack by atmospheric corrosion.

Just how important these properties are in prolonging mine car life is shown by the fact that although more than 16,000 COR-TEN cars are now in service—and many of them have been in use for more than 10 years—we have yet to hear of a single failure due to wear. Have you a copy of the new COR-TEN catalog?

U·S·S HIGH STRENGTH STEELS

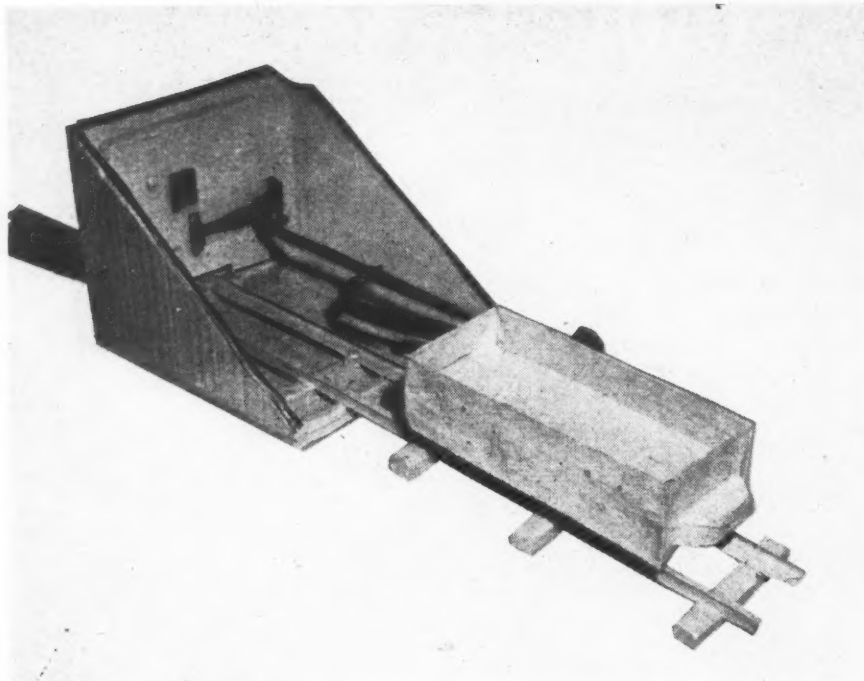
U·S·S COR-TEN • U·S·S MAN-TEN • U·S·S ABRASION-RESISTING • U·S·S MANGANESE-NICKEL-COPPER



UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago & New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh & Chicago • COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh • TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
UNITED STATES STEEL SUPPLY COMPANY (Warehouse Distributors), Chicago • UNITED STATES STEEL EXPORT COMPANY, New York

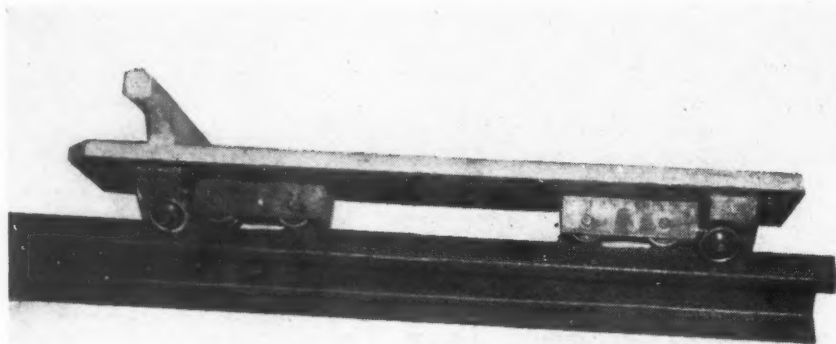
Prize "Gadgets" at Bluefield Show



Mine Door, One-Man Scooter, Locomotive Grease Fitting and Car Stop Prize Winners in "Gadget Contest", Featured at Southern Appalachian Industrial Exhibit, Bluefield, W. Va.

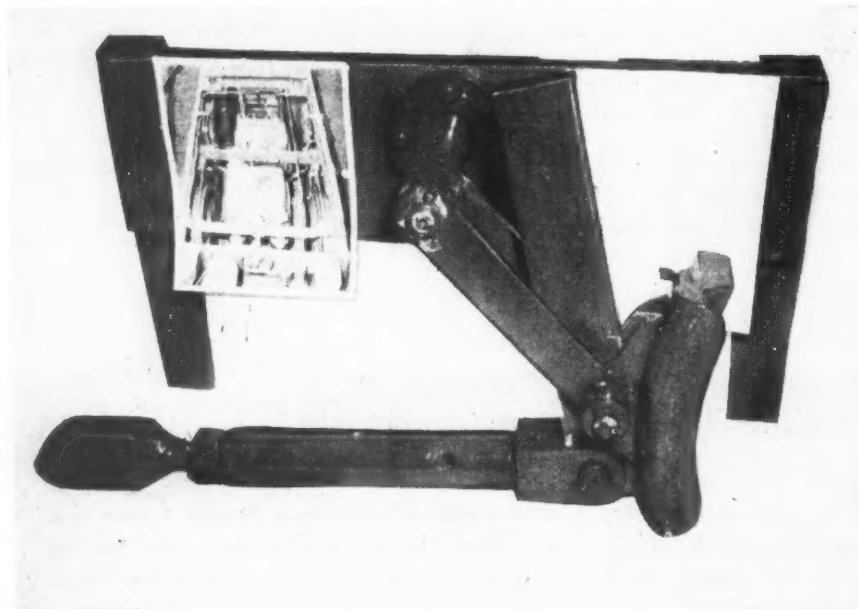
Automatic Mine Door

FIRST PRIZE in the "Gadget Contest" at the Bluefield Exhibit went to L. H. Hawkes, Montgomery, W. Va., for this model of a new type of automatic mine door. As can be seen from the photograph of the model at the left, the side of the locomotive or mine car pushes a pivoted horizontal bar that acts on a hinged lever to open the door. Trips approaching from the opposite side open the door by pushing directly against it.



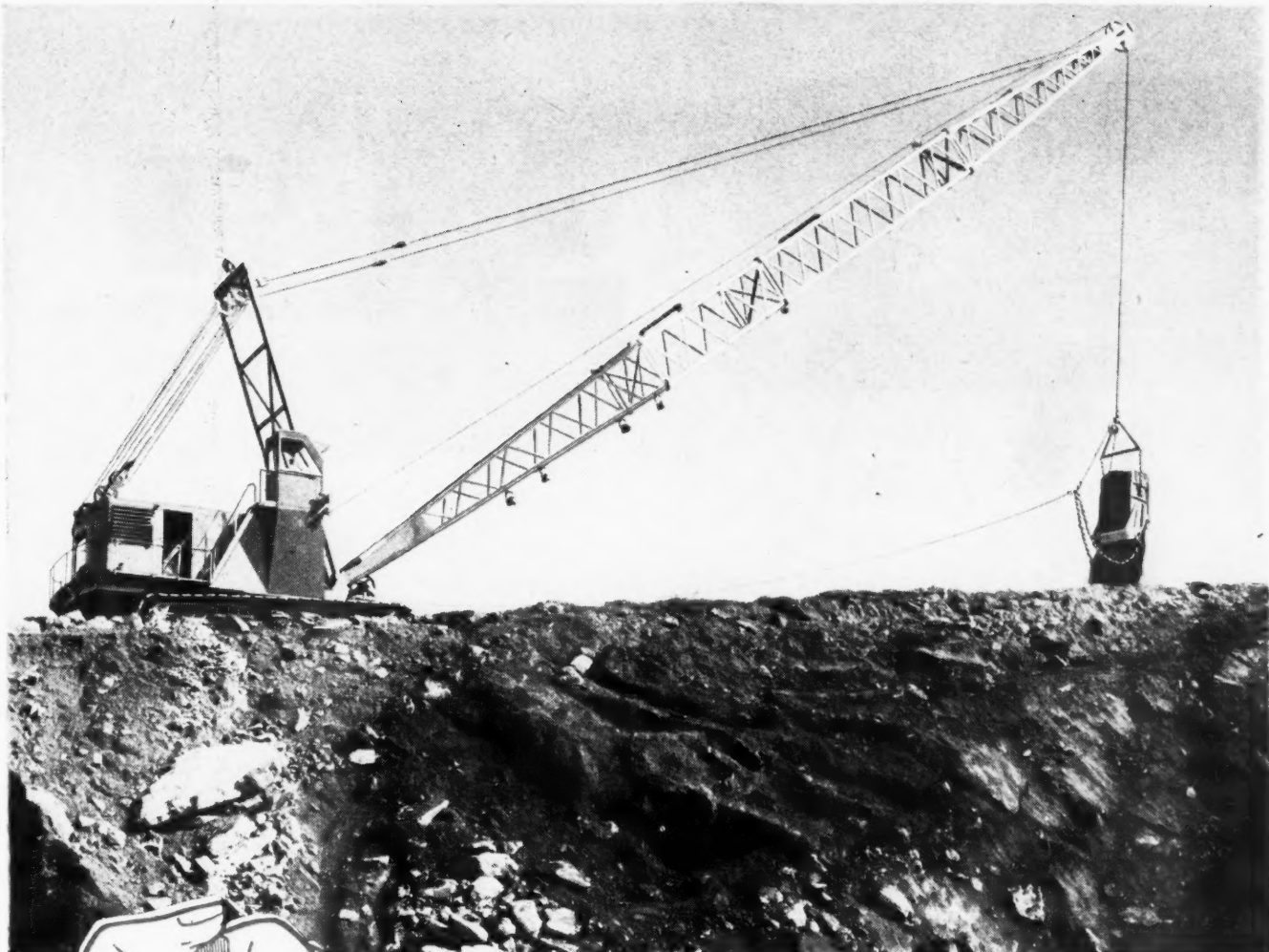
Low-Coal Scooter

SECOND PRIZE also was won by L. H. Hawkes, Montgomery, W. Va., for this one-man rail scooter for use in low coal, shown at the left in a tipped position partially off the rail to illustrate the arrangement of the rollers. The two sets of tandem carrying rollers are placed so as to minimize vibration as the scooter passes over the rail joints. To assist in keeping the scooter on the rail, each of the two individual rollers at each end are set at an angle. They are positioned high enough, however, to cut down possible interference from dirty track.

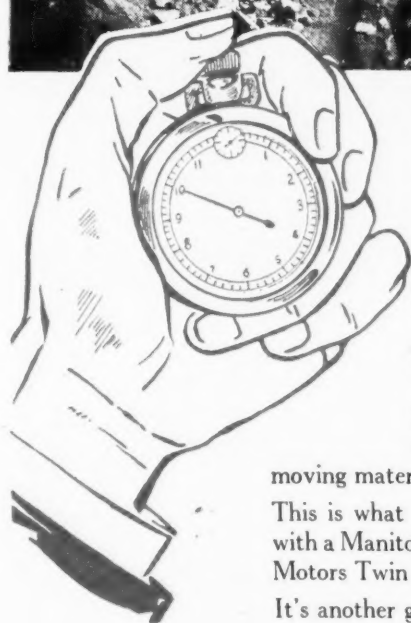


Grease Fitting Added To Brake Turnbuckle

THIRD PRIZE was awarded for the addition of a grease-gun fitting to a turnbuckle barrel, which by the elimination of rusted threads has reduced the difficulties of adjusting locomotive brakes often caused by stuck turnbuckles. The device is in use at the mines of the American Coal Co., McComas, W. Va., and was entered in the contest by R. O. Cole, superintendent, and S. S. Cooper, chief electrician. As shown in the photograph at the left, the exhibit included an assembly of the brake hanger, shoe and turnbuckle, together with a photograph of a locomotive with the grease-filled turnbuckle in use.



Manitowoc crane and dragline owned by the Coal Rain Coal Co., Jundale, Penna., and powered with a General Motors Series 71 "Twin" Diesel engine.



A pass every 50 seconds

WHEN you drag a four-yard bucket from the end of a 140-foot boom and make a pass every 50 seconds, you're really moving material.

This is what the Coal Rain Coal Co. is doing with a Manitowoc crane powered with a General Motors Twin 6 Diesel engine.

It's another good example of what GM 2-cycle Diesel power can do. With power at every down-

stroke, pick-up is fast, response is rapid, and there's unusual power for a Diesel so compact, so reasonable in size and weight.

GM "71" Diesels are setting performance records in all kinds of equipment. They step up production, cut down maintenance and lower fuel costs.

Isn't this the kind of power you want? It's certainly well worth looking into. So write today and let us give you full particulars.

DETROIT DIESEL ENGINE DIVISION

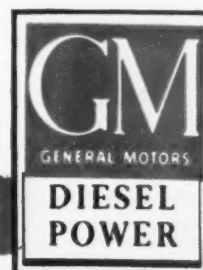
SINGLE ENGINES... Up to 200 H.P.

DETROIT 28, MICHIGAN

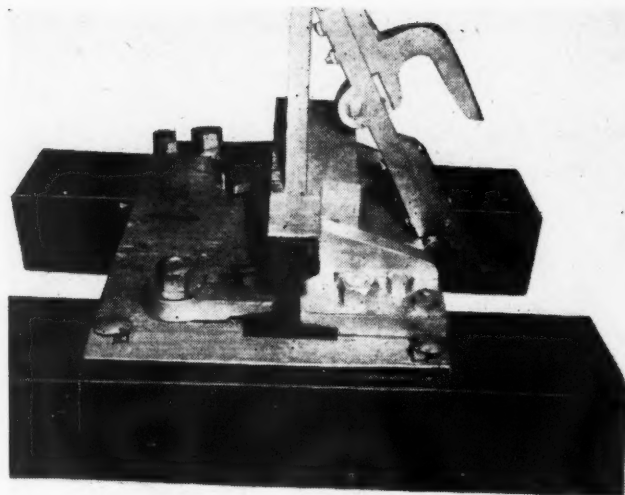
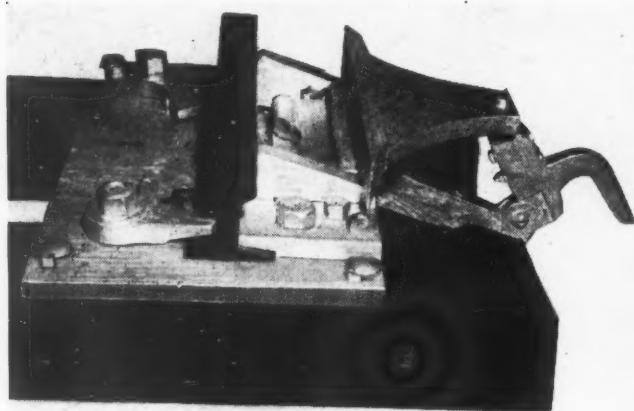
MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAVN WITHOUT THE BULK



... Bluefield "Gadget" Entries



Car Stop Features Reliability and Easy Application

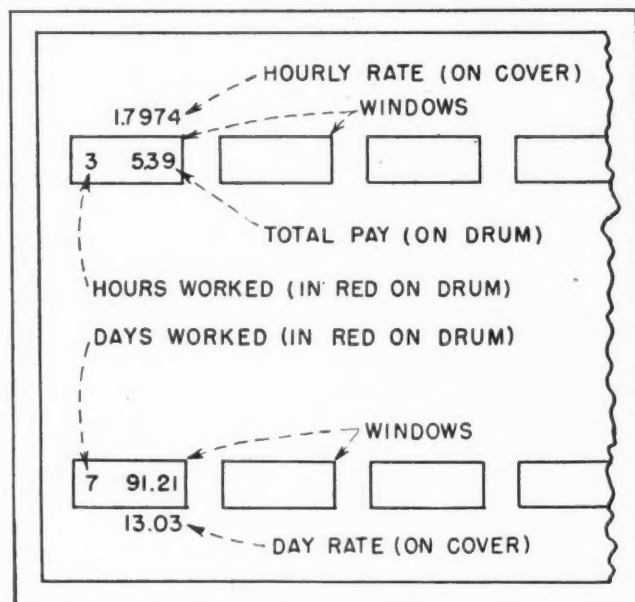
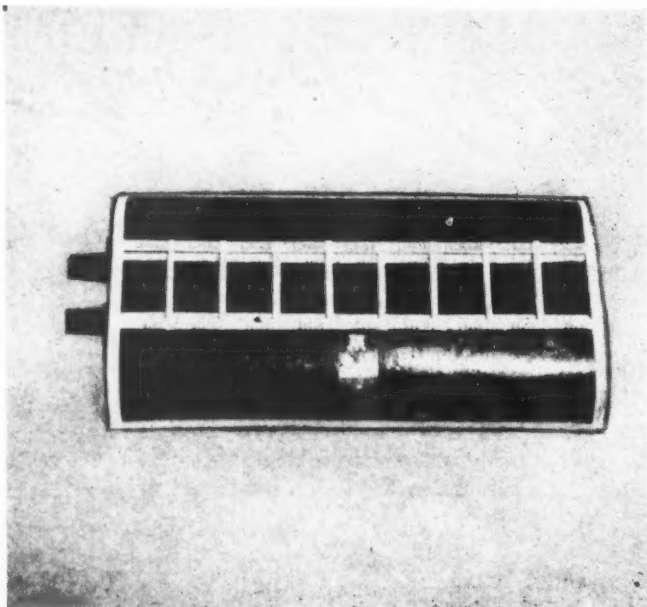
FOURTH PRIZE went to this wooden model of a car stop shown above in an open position clear of the rail (left) and in a holding position (right). More than 30 of the stops constructed of steel are in use on side tracks and changing points in the Freeport Seam mine of Howard Collieries, N. & W. Ry., Chatteroy, W. Va., and are said to feature ease of application and removal, together with reliability in holding long trips

on steep grades. On some tracks in the mine, with grades up to 3 percent, the stops hold trips of 23 cars each carrying 3 tons of coal. The device was entered by B. E. Kitner, assistant general mine foreman, Marshall Williams, Eules Barker and Ashland Jackson.

Cam Lugs 3 and 4 are locked in place with cotter pins. The handle used to swing the stop clear of the rail is built in combination with a

locking device. Where low and wide mine cars are in use, and it is thus impossible to reach the handle by hand, a switch throw can be connected to the hole at the end of the curved part attached to and extending down from the combination handle and locking device. With steel ties and use of mine cars that permit reaching the handle, the curved part, which would hit the mine bottom, can be eliminated.

Calculator Reduces Payroll Errors

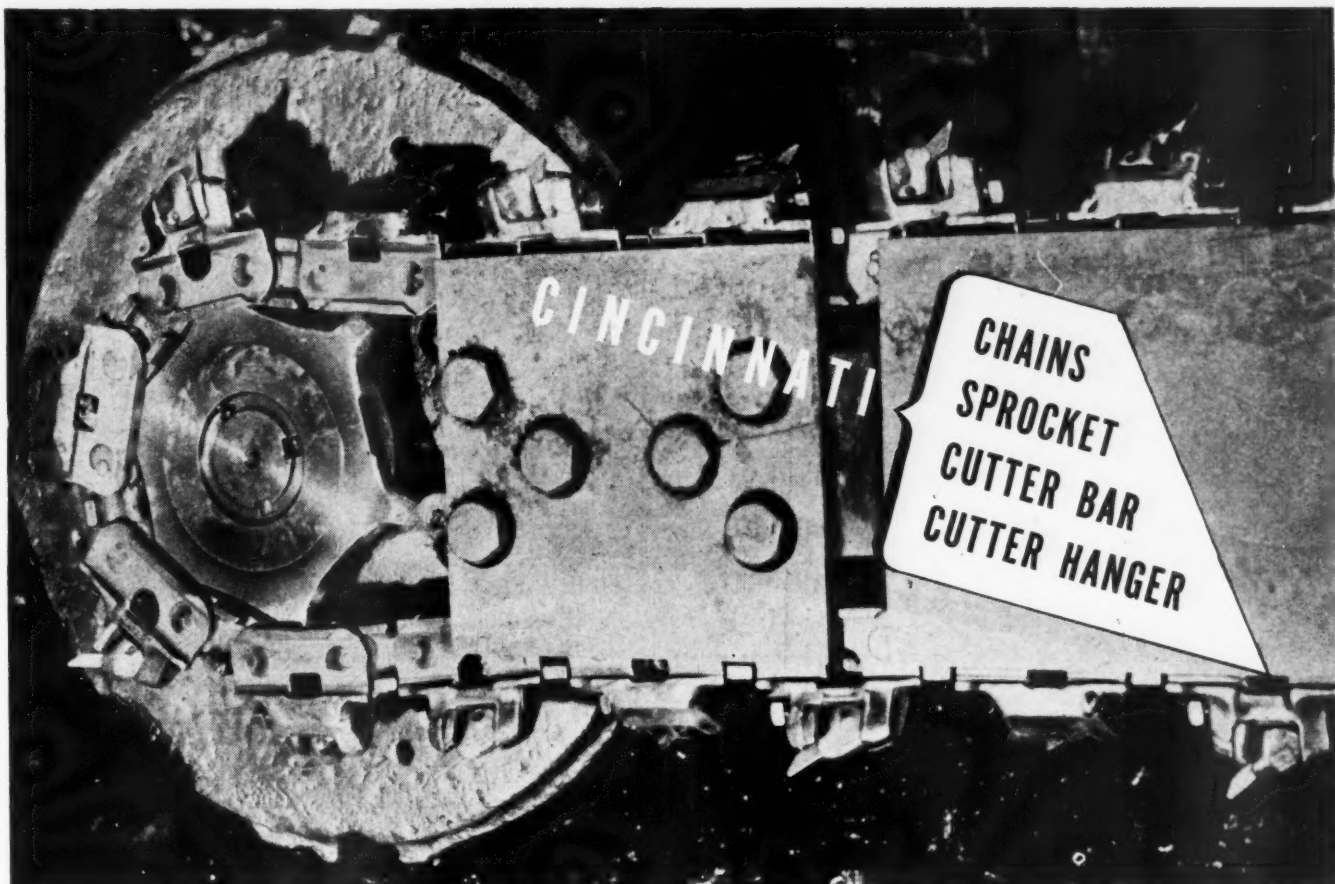


LESS POSSIBILITY for error in calculating payrolls as compared with use of a table where all figures are visible all of the time is reported to be a major advantage of the "Jackson Multichart Calculator" exhibited in the Southern Appalachian "Gadget Contest" by M. L. Jackson, account-

ant, Black Band Coal Co., Olcott, W. Va. The "chart," which Mr. Jackson made at the mine and uses regularly, measures only 4x10 in.

As shown in the photograph and explanatory drawing above, pay for a certain number of hours or days is readily secured by turning a knurled

knob, which rotates a paper band or drum inside that carries the figures of hours or days worked and the resulting total pays. The rate on which the pay figures in each window are calculated is printed on the outside case adjacent to the respective window.



Close-up view showing Cincinnati Cutting Equipment (Duplex Chain, Bit, Bar and Sprocket) mounted on Sullivan 7-AU machine ready to shear. The operation where this photograph was taken has many Sullivan 7-AU machines in use and has standardized on this type of Cincinnati Equipment.

CINCINNATI COAL CUTTING EQUIPMENT MEANS LOWER CUTTING COSTS!

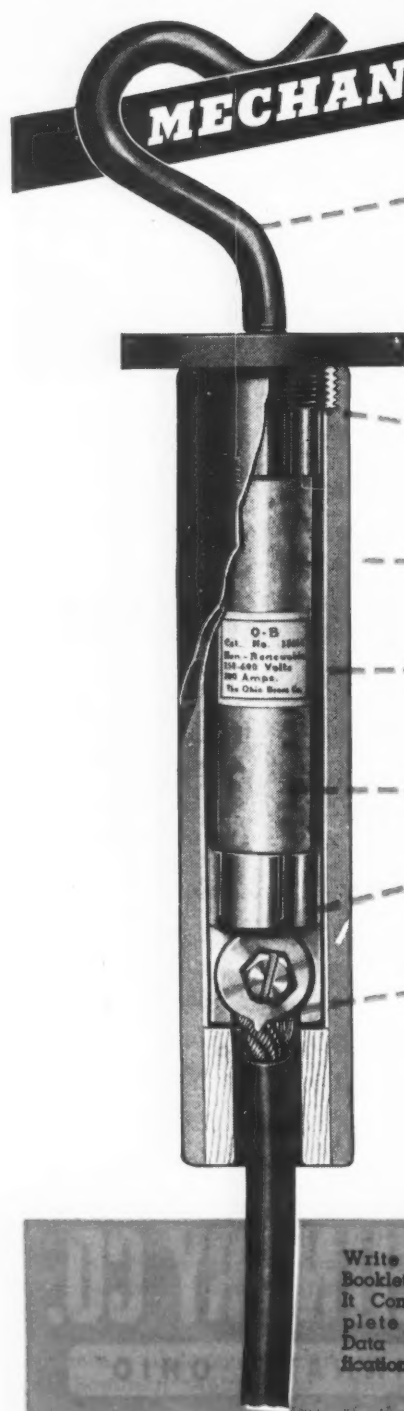
DEEP down in thousands of American coal mines and in many foreign mines, Cincinnati Coal Cutting Equipment is performing with maximum efficiency and a minimum of servicing. If you are not now using Cincinnati Chains, Bits, Bars and Sprockets we suggest you talk to one of the Cincinnati Mine Representatives in your territory or write us direct. They will welcome the opportunity to prove to you that Cincinnati Chains, Bits, and Bars will use less power . . . provide more tonnage at less cost and at the same time decrease maintenance costs. Cincinnati Chains are built to meet all cutting conditions . . . your problem is ours. Let us hear from you . . . there's no obligation.

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News Round-Up



Continued Scholarships Won by W. Va. Students

All eight of the West Virginia University students who won the 1947-48 scholarships in mining engineering established last year by the West Virginia Coal Association were so successful in their studies during the past academic year that the scholarships have been re-awarded to them for 1948-49. G. R. Spindler, director of the University's School of Mines, announced Sept. 22. The association is spending \$25,000 over a five-year period for the scholarships, which are worth \$625 annually.

The students receiving the awards for the second year are: Daniel L. Ashcraft, Wheeling; Gilbert Davidson, Kimball; Frank C. DeBolt, Holden; Lewis R. Kay, Charleston; Jack Ice Poundstone, Morgantown; William C. Taylor, Richwood; James A. Todd Jr., Madison; and William J. Marsh, Charleston.

Railroads Ask I.C.C. to Hike Coal Rates Again

The nation's railroads Aug. 27 petitioned the Interstate Commerce Commission for an increase in freight rates on coal, coke and iron ore by amounts that would yield \$140,000,000 annually on the basis of their 1947 traffic. The petition calls for an increase of 25c. a net ton, or 28c. a gross ton, on anthracite and bituminous coal and coke, and 20c. a net or gross ton on iron ore in the East or South.

In seeking the change, the carriers stated that since 1939 freight rates on anthracite and bituminous coal have increased 27 percent, those on coke by 25 percent, and on iron ore by 20 percent, while rates on all commodities, including these, have increased by about 44 percent. They said that they also were considering seeking increases on general traffic, in addition.

In their petition, the railroads contended that coal and iron ore traffic are able to bear their "fair share of increased railway costs" as their prices have gone up far more than the increase in revenue of Class I railroads for transporting them. They said that the mine price of bituminous coal had increased from \$1.91 per net ton in 1939 to a present average of \$4.60 a ton, and that this con-

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stituted the major item in the increased cost of railway fuel.

Captive Mine Contract Hit By NLRB Counsel

In a final brief filed last month before the National Labor Relations Board, Robert N. Denham, NLRB general counsel, reiterated his previous contention that the union-shop clause in the contract between the captive mines and the U.M.W.A. violates the Taft-Hartley Act. In his brief, which was filed in connection with the unfair labor practice charge brought against the union early this summer, he also said that John L. Lewis and other union officials must sign non-Communist affidavits and hold an election



First Pension Payment Made From U.M.W.A. Fund

THE FIRST \$100-monthly pension check to be paid by the Health and Welfare Fund is presented by John L. Lewis, Sept. 9, in Washington, D. C., to Horace M. Ainscough, 62, of Rock Springs, Wyo. Mr. Ainscough, who first went to work in the mines in England in 1914, was employed by the Union Pacific Coal Co. from 1927 until last February, when he became ill.

At the formal ceremony marking issuance of the first check, which was recorded by newsreel and newspaper cameras, it was announced that approximately 450 applications for pensions from 17 states had been received.


Applications had been made available in local union offices during August.

Later, on Sept. 17, three mine workers, each representing one of the anthracite districts, received from Mr. Lewis checks representing the first pension payments from the Anthracite Health and Welfare Fund, at a ceremony in Hazleton attended by Thomas Kennedy, vice president of the union, other union officials and representatives of the industry. Recipients of the checks were: Robert Fox, 67, West Pittston; Wash Fedora, 73, Lansford; and John Close, 72, Mahanoy City.

New Coal-Mining Record Set as . . .

CONSOLIDATION COAL CO. (W.VA.)

MINE NO. 63



WORLD'S CHAMPION COAL LOADING CREW

1536 TONS IN ONE SHIFT JUNE 14, 1948.

Top Row	Walter Vasmek	Robert Hall	James Thompson	Frank Leaczynski	Albert Knoble	Clarence Wright	Clarence Woods	Dominic Flaminio	George Evans	Albert Toothman
Bottom Row	Walter Gabelski	John Reiten	Joseph Flori	Floster Ewen	Julius Basagic	Alexander Lacombe	Mike Manko	Eeri Welton	Woodrow Davidson	

Consol (W. Va.) Crew Loads 1,536 Tons

WHAT IS BELIEVED to be the world's record for coal loaded out in one shift was established June 14, 1948, when this 19-man crew, including Woodrow Davidson, section foreman, mined 1,536 tons at Mine No. 63, Consolidation Coal Co. (W. Va.), Monongah, W. Va. The previous loading record reported was that of a 14-man crew at Mine No. 207, Consolidation Coal Co. (Ky.), Dunham, Ky., which loaded 1,466 tons on Sept. 25, 1947 (*Coal Age*, December, 1947, p. 116). Previously, a 20-man crew at Mine No. 38, Consolidation Coal Co. (W. Va.), had mined 1,402 tons on

Sept. 16, 1946 (*Coal Age*, November, 1946, p. 126).

In setting this mark, the crew from Mine No. 63 loaded out 35 cuts of coal. The Pittsburgh seam, 8½ ft. thick, was mined, and cuts were 9 ft. deep. Equipment employed included three shuttle cars, one Joy 11BU loader and a Sullivan 10RU cutter.

While these tonnage records are the largest ever reported according to *Coal Age's* records, the editors would welcome, now or any time in the future, information about any crew that may approach or exceed these marks.

before the union-shop provision is legal.

Insistence upon the union-shop clause, he stated, violates three sections of the Act by: (1) using "coercion and restraint" against employees; (2) attempting to cause employers to discriminate against employees on the basis of their union membership; and (3) constituting a refusal to bargain in good faith. In its brief, the union contended that the contract was an extension of the old contract that included the union shop and that therefore no vote on the issue was required.

Obituaries

Harry C. Faust, 56, general manager, United Pocahontas Coal Co., Crumpler, W. Va., was killed almost instantly Sunday, Aug. 29, by a fall of rock as he was showing his daughter and her friends through a company mine at Worth, W. Va. The accident occurred about 50 ft. inside a new drift being opened. Other mem-

bers of the party, jumping in an opposite direction from that taken by Mr. Faust, were uninjured. Mr. Faust first joined the company in 1917 as mining engineer and was named general manager in 1921.

Edward Jones, Old Forge, Pa., a mine foreman for the Kehoe-Berge Coal Co., Pittston, Pa., died at his home Aug. 30.

Kenneth Donaldson, 38, assistant mine manager, Mine No. 2, Superior Coal Co., Gillespie, Ill., was killed Aug. 18 while at work in making repairs to the mine shaft. Mr. Donaldson and several others were re-timbering the shaft, working from a platform within the shaft, when a lowered cage struck and tilted the platform. Mr. Donaldson was knocked off the platform and fell to the bottom of the shaft.

John T. Sydnor, 60, president and general manager, Rail & River Coal Co., Bellaire, Ohio, died Sept. 12 at Wheeling, W. Va. Prominent in the industry for many years, Mr. Sydnor had formerly been vice president and general manager of the West Virginia

Coal & Coke Co., Omar, W. Va., and president of the Mt. Sterling Land Co. He was a past president of the West Virginia Coal Association and was a member of the State Planning Board. He also was outgoing president of the Oldtimers' Club of Charleston and had been a leader in Boy Scout work in West Virginia for many years.

Jonathan P. Edwards, 78, president, Jonathan Coal Mining Co., Philadelphia, Pa., died Sept. 12 in the University Hospital, Philadelphia. Mr. Edwards had been active in the coal business for many years, having been first vice president of the George B. Newton Coal Co. before forming the Jonathan Coal Mining Co. He was one of the pioneers in reclaiming river coal and also was widely known as a golf enthusiast and for his activity in the formation of a number of golf clubs.

Walter B. Miller, 68, consulting engineer for the Guyan Eagle Coal Co., Amherstdale, W. Va., died Sept. 16 at his home in Huntington. Mr. Miller, who had been general manager of the Kentucky King Coal Co., Harlan, Ky., for 35 years, had been with Guyan Eagle since 1941.

Personal Notes

George W. Lauterbach has resigned as vice president of the Republic Coal & Coke Co., Chicago, to become president of the Frontenac Coal Mining Co., which is reportedly developing a mine near Danville, Ill.

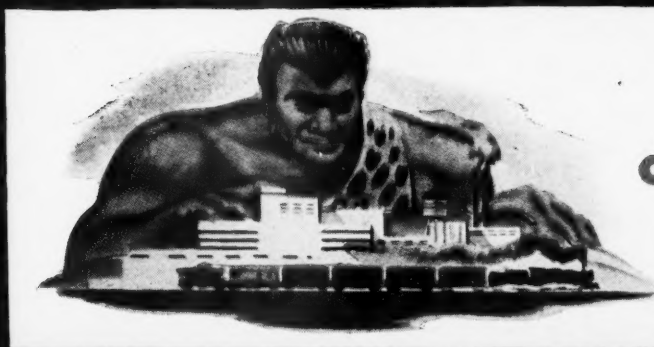
Robert P. Koenig, president, Ayrshire Collieries Corp., Indianapolis, and chairman of the National Bituminous Coal Advisory Council to the Secretary of the Interior, has been named a special consultant on coal and coal mining problems to the Economic Cooperation Administration mission in London. Mr. Koenig was scheduled to sail from New York Sept. 23 for a month's stay in England and France.

William Guiney has been named superintendent of the new Zeigler No. 3 mine of the Bell & Zoller Coal & Mining Co., Zeigler, Ill. **Harry Belcher** has been appointed to succeed Mr. Guiney as mine manager of Zeigler No. 2 mine.

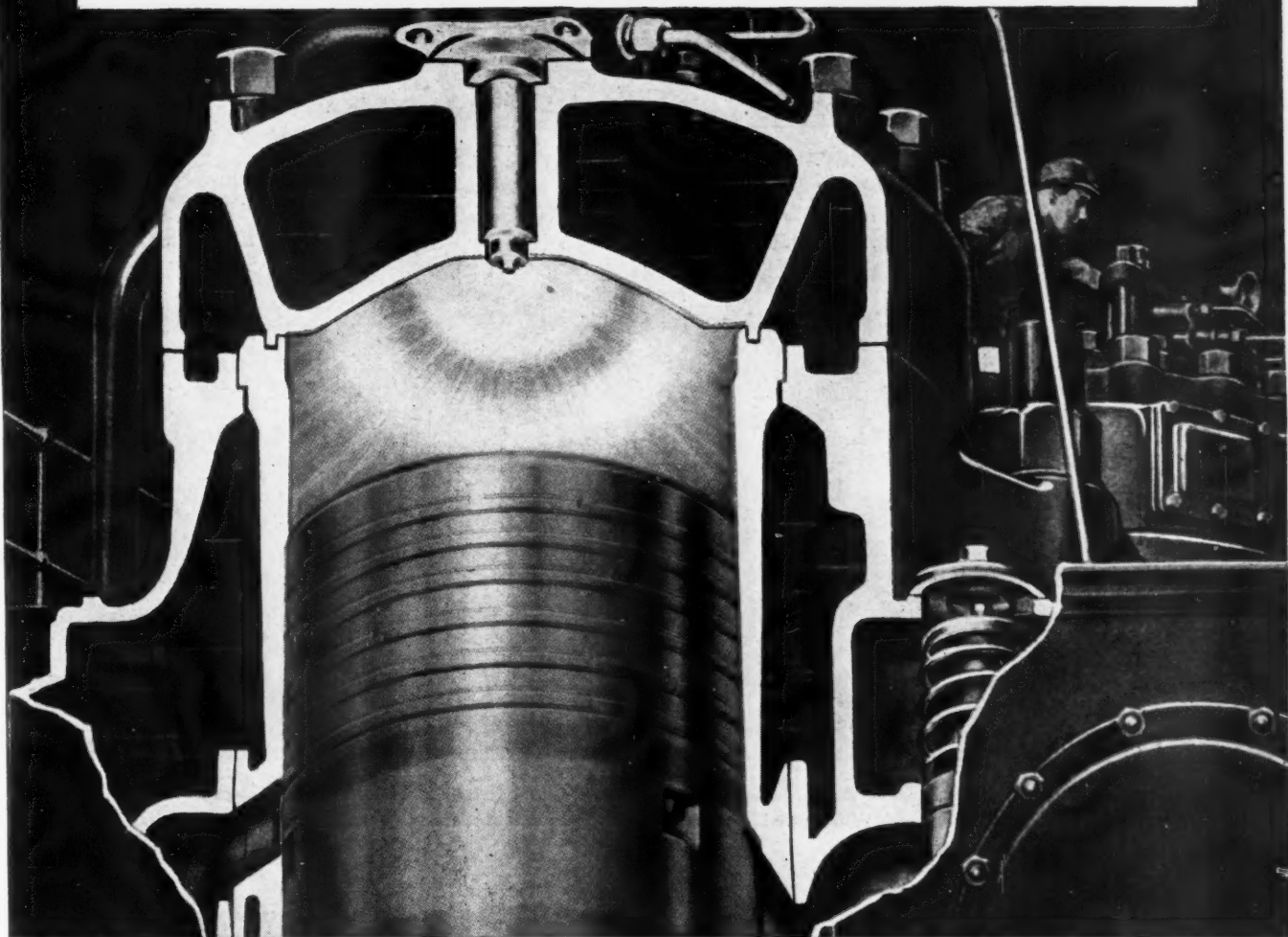
Roy Canic has been appointed general mine foreman, Lorado No. 5 mine, Lorado Coal Mining Co., Saunders, W. Va. **Frank Osborne** has been promoted from general assistant mine foreman to mine foreman. **Wade Bailey**, formerly night mine foreman, has been made general assistant mine foreman on the day shift, and **William Smith** has been advanced from unit foreman to night mine foreman.

Nathaniel Kirk, formerly a coal mine inspector for the U. S. Bureau of Mines, has been named to the newly

(Continued on p. 131)



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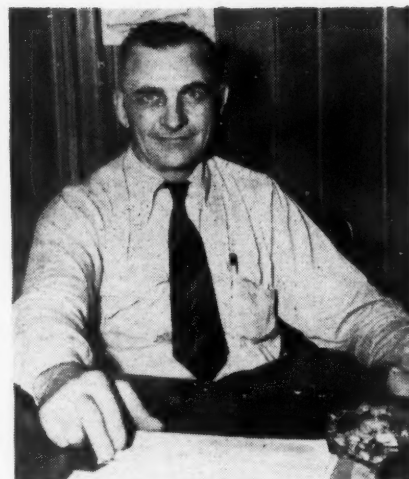
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J. M. Lee (standing, left), outside foreman, Harris mine, Colorado & Utah Coal Co.; J. B. Burns, manager, operations; Gene Walker, face boss; Donald Haske, general mine foreman; Walter Skinner, material clerk; kneeling: Victor Zulian (left), Albert Lloyd, face bosses; Nat Stuart, power-plant superintendent; Charley Zulian, face boss.



C. E. Mattox, superintendent, Sooner mine, Sooner Coal Mining Co., Oologah, Okla.

COAL MEN



W. J. Gunther (left), Imperial Coal Co., Erie, Colo.; Martin G. Vancil, top foreman, Eagle mine; and Wilbur Metz, general mine foreman.



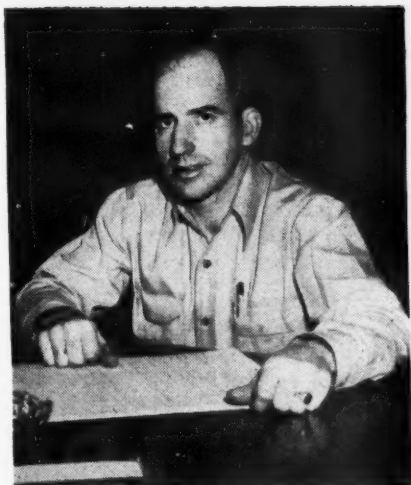
Pete Bellodi (left), chief electrician, Eagle mine, St. Vrain, Colo.; and Frank Kolar, general superintendent, Imperial Coal Co., Erie, Colo.



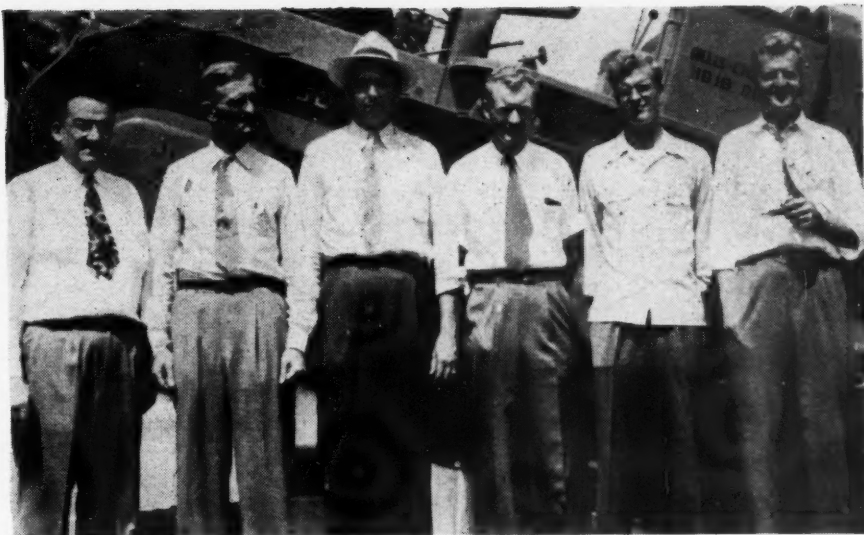
Rex H. Ritter (left), fuel engineer; C. L. Russell, superintendent, and Paul Enlow, outside foreman, MacBeth mine, Hutchinson Coal Co., Hutchinson, W. Va.; and C. E. Stinnette, chief electrician, Logan Division



Cecil Wilkinson, superintendent, Old Mac mine, Old Mac Coal Co., Red Oak, Okla.



H. A. DeMoss, ass't. supt., Sooner mine, Sooner Coal Mining Co., Oologah, Okla.



G. P. Molzahn, (left), eastern territory manager, Allis-Chalmers Mfg. Co.; Russell Badgett Sr., Badgett Construction Co., Memphis, Tenn.; Alex Johnson, Williams Tractor Co., Louisville, Ky.; Rogers Badgett, Brown Badgett and Russell Badgett Jr., Madisonville Mine Stripping Corp., Madisonville, Ky.

ON THE JOB



John Beal (left), superintendent, Jackson No. 2 mine, Bates, Ark.; L. A. Jackson, president, and J. J. Anderson, general superintendent, Jackson & Squires Coal Co., Mansfield, Ark.



Walter Goudge (left), weighmaster, and James T. Hackett, superintendent, Black Diamond mine, The Black Diamond Fuel Co., Lafayette, Colo.



Lester Odum, ass't supt., Old Mac mine, Old Mac Coal Co., Red Oak, Okla.



Erwin C. Trogdo (left), outside foreman, Amherst No. 1 mine; Harold Webb, foreman, main machine shop; A. H. Newland, maintenance superintendent; and O. D. Chambers, tipple clerk, Amherst No. 1 mine, Amherst Coal Co., Amherstdale, W. Va.



The 15-Ton Low Liner.. *26 inches low*

... a standard Westinghouse mine locomotive designed and built to meet the *special* requirements for mining low seam coal.

The low height and excellent clearance allows this versatile locomotive to operate in seams of thickness formerly limited to gathering locomotives. It's your answer to the increasing demand for getting out every possible ton of coal . . . efficiently and economically.

Although *The Low Liner* can be built 26 inches low, all important standard details of

design and construction have been maintained: flush-frame construction for safety and ample equipment space; roller journal bearings with boxes removable without untrucking; leaf springs for smoother riding; cross equalization for better tracking; electro-pneumatic control for positive operation.

Consult your Westinghouse office or write for B-3702, "The Low Liner", Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-15129



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Mine Locomotives



World Wide Photos

Soviet-Blockaded Berlin Gets Its Coal by Air

TRUCKS LOADED with coal to be flown into Berlin back up to U. S. Airforce C-54's at the Fassberg airport in the British zone of Germany (left). German civilian workers (right) are shown unloading the coal after arrival at the Gatow airport in Berlin. Air transport by British and American crews is fast becoming a routine operation, it is reported, with blocks of planes shuttling between the two airports on a 24-hr. schedule. Flying time is about an hour each way and most crews make three flights a day. Both British C-47 Dakotas and American C-54 Skymasters are being used.

Coal and Business Activity

		1948 to This Date	1948 Over 1947, to Date
Est. anthracite prod., wk. ending Sept. 11...	952,000	39,601,000	+ 1.1%
Est. bituminous prod., wk. ending Sept. 11...	10,775,000	402,426,000	— 5.3%

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, net tons)			Consumption (Thousands, net tons)			
	Aug. 1, 1948	Day's Supply	July 1, 1948	Aug. 1, 1947	July, 1948	June, 1948	July, 1947
Electric power utilities.....	18,551	75	17,041	15,292	7,701	7,520	6,719
Byproduct coke ovens.....	8,975	34	10,474	4,804	8,233	8,036	7,696
Beehive coke ovens.....	†	†	†	†	694	848	662
Steel and rolling mills.....	1,134	53	1,269	1,086	663	798	718
Cement mills.....	1,364	59	1,361	968	721	690	648
Other industrials.....	17,579	76	17,234	13,218	7,155	7,661	8,749
Railroads (Class I).....	8,388	35	8,787	6,808	7,408	7,432	8,151
Retail dealers.....	2,148	13	1,844	3,190	5,170†	5,943†	5,318†
Total.....	58,139	48	58,010	45,366	37,745	38,928	38,661

Source: U. S. Bureau of Mines. †Not available. ‡Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, week ending Sept. 11.....	194.1	194.9	186.4
Steel ingot operations (% of capacity).....	96.1	95.0	89.4
Electric power output (million kw.-hr.).....	5,166	5,318	5,053
Crude oil production (daily avg., 1,000 bbl.).....	5,346	5,507	5,217
Misc. & L.C.L. carloadings (daily avg., 1,000 cars).....	85	80	88
All other carloadings (daily avg., 1,000 cars).....	64	67	66
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100).....	421.4	428.0	435.0
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100).....	278.2	279.2	270.8
Prices, domestic farm products (B.L.S., Aug., 1939 = 100).....	345.0	355.3	391.3
Prices, finished steel composite (Steel, ton).....	\$93.86	\$93.86	\$75.41
90 stocks, price index (Standard & Poor's Corp.).....	125.4	125.5	119.6

*Date of latest week for each series on request.

created position of safety director for the New Kathleen mine, Union Colliery Co., DuQuoin, Ill. Mr. Kirk, who has had more than 30 years' mining experience, was a superintendent with the Pittsburgh Consolidation Coal Co. before joining the Bureau.

John Lindley, first mine safety inspector employed by the Coal Division, Eastern Gas & Fuel Associates,

recently retired as general inspector of the company's accident prevention department. Mr. Lindley, who was born and raised in England, went to work in the mines there at the age of 13. He came to the United States in 1903. He held supervisory positions in several West Virginia mines and in 1928 became safety inspector for the Elkhorn Piney Coal Mining Co., a predecessor of the Koppers

Coal Co. He was made director of safety for the company in 1940, serving in that capacity until 1942 when the departments of labor relations and accident prevention were combined. At the present, Mr. Lindley is living in Fayetteville, W. Va.

Edgar J. Gealey has been named a fuel engineer for the Munitions Board of the National Military Establishment, Washington, D. C. Mr. Gealey, who during the 20's was a member of the editorial staff of *Coal Age*, recently returned from a stay of more than two years in Europe, where he was last associated with the Office of Military Government in Berlin as an industrial adviser to the industry branch, in connection with bizonal arrangements with the British. In the course of his duties, he visited many coal mines and industrial plants in Germany, including the Soviet Zone, and in Poland and Czechoslovakia.

Joseph Skiba, superintendent, Pond Creek No. 3 mine, Pond Creek Poca-hontas Co., has been appointed general superintendent of the company's mines at Bartley, W. Va.

Glen E. Kitchen, associated with the Island Creek Coal Co. in various capacities for the past 7½ years, has resigned to become assistant to the vice president and general manager of the three mines of the Dickinson Fuel Co., Charleston, W. Va.

Paul R. Paulick, consulting engineer, Library, Pa., who left for China early this summer to represent the coal mining division of the Economic Cooperation Administration, returned to the United States Sept. 1 after covering coal and metal and non-metallic mines in various parts of the country.



OLDEST MEMBERS of the Pioneer Miners Club with the Queen of the Bluefield Exhibit, Miss Mary Mustard. The miners, who received an easy chair in recognition of their record, are: John McDaniel (left), 84 years old, Stotesbury, who has worked 65 years in the mines; A. C. Nelson, 80, Pocahontas, Va., worked 66 years; and William Norris Sr., 84, Elkhorn, worked 63 years.



50 YEARS IN THE MINES without an accident is the record of these five "Pioneer Miners." More than 200 members with 50 years or more service in the mines attended the reunion of the Pioneer Miners Club, which was a feature of the final day of the Bluefield Exhibit. Men with the best safety records were feted and over 200 door and other prizes were awarded.

Bluefield Show Sets Record

NEARLY 600 different items of mining equipment, machinery and supplies were on display at the biennial Southern Appalachian Industrial Exhibit held at the N. & W. freight station, Bluefield, W. Va., Aug. 19-21, and attended during the three-day period by a record-breaking crowd estimated at 45,000 persons. According to reports, the show was estimated to be one-fourth larger than any previous show, with an attendance one-third greater.

Among the features of the final day were the reunion of the Pioneer Miners Club composed of over 200 men who have worked in the mines for 50 years or more and the awarding of prizes in the Gadget Contest. Prize-winning entries in this contest, which were judged on their practicability and the ingenuity of the inventor, are illustrated and described on pp. 120 and 122 of this issue.

In addition to the numerous exhibits set up inside the building, considerable heavy equipment for materials handling, hauling and other outside uses was on display on lots adjoining the freight station, while for underground operations the heavy equipment consisted of one cutting machine, one track locomotive, a rubber-tired locomotive, a track-cleaning machine, two mine cars, portable air compressors, rock dusters, chain conveyors and utility tractors.

Educational exhibits or demonstrations were featured by the U. S. Bureau of Mines; Bituminous Coal Institute; School of Mines, West Virginia University; and the West Virginia Department of Mines.

The Pioneer Miners Reunion, with

Fred J. Bailey, Cardox Corp., as chairman, was opened by talks by W. E. McQuail, general superintendent, Turkey Gap Coal & Coke Co.; W. E. E. Koepler, secretary, Pocahontas Operators' Association; A. Harry Vest, mayor of Bluefield; E. L. Chatfield, inspector-at-large, W. Va. Department of Mines, Pocahontas Division; A. U. Miller, supervising engineer, U. S. Bureau of Mines, Mt. Hope, W. Va.; S. D. Clemens, M.D., Arista, W. Va.; and W. J. German, Pocahontas Fuel Co.

More than 200 members of the Pioneer Miners Club attended the reunion. Leather-covered easy chairs were presented to A. C. Nelson, William Norris Sr. and John McDaniel for being the oldest pioneer miners present. Men with best safety records were acclaimed and approximately 200 door and other prizes were awarded. Fifteen pioneer salesmen of mining equipment were made honorary members of the club.

With Mr. McQuail as general chairman and B. B. Houseman serving as director, the exhibit, sponsored by the Pocahontas Electrical & Mechanical Institute, included the following:

I-T-E Circuit Breaker Co., Philadelphia — Automatic reclosing circuit breakers for stations and sectionalizing.

American Mine Door Co., Canton, Ohio — Canton track-mounted rock duster, improved finger boards, electric switch throwers, portable dust distributor and the Canton track cleaner.

Electric Railway Improvement Co., Cleveland, Ohio — "Erico" rail bonds and welders.

Browning Mfg. Co., Maysville, Ky. — "Grip-belt" V-belt drives and sheaves and paper motor pulleys.

Post-Glover Electric Co., Cincinnati, Ohio — P-G resistors, transfer switches, resistance welders and other electrical products.

Guyan Machinery Co., Logan, W. Va. — Resistors, headlights, welders, foot-valve strainers, line starters, foot warmer for slate pickers and air-flow indicator.

A. Leschen & Sons Rope Co., St. Louis, Mo. — Hercules "Red Strand" ropes.

Bluefield Hardware Co., Bluefield, W. Va. — Allis-Chalmers transformers and pumps, "Steel Grip" pullers, Gemco track tools, Goodyear belts, Bethlehem track equipment, Economy fuses, Sherwin-Williams industrial finishes and J. H. Williams wrenches and shop tools.

Sherwin-Williams Co., Cleveland, Ohio — See Bluefield Hardware Co.

Bethlehem Steel Corp., Pittsburgh, Pa. — See Bluefield Hardware Co.

Economy Fuse & Mfg. Co., Chicago — See Bluefield Hardware Co.

Mine Safety Appliances Co., Pittsburgh, Pa. — New high-pressure face duster, new "Mine Radio" communication system, "Bantam" high-pressure rubber-tired rock-dust distributor designed to be carried on belt or pan conveyor and on shuttle car or rubber-tired truck, "Chemox" oxygen breathing apparatus, flame-safety-lamp testing equipment, hats, shoes, goggles and other protective clothing, methane and CO₂ detectors and recorders, gas masks and oxygen apparatus, rescue apparatus, self-rescuers, permissible shot-firing units, first-aid materials and kits, Edison cap, hand and trip lamps, other safety products and "Velocity Power" tools.

National Electric Coil Co., Columbus, Ohio — Coils and insulation, including silicone types.

Allis-Chalmers Mfg. Co., Milwaukee, Wis. — Type AR motors, "Texropes" and "Texrope Vari-Pitch" sheaves, mine



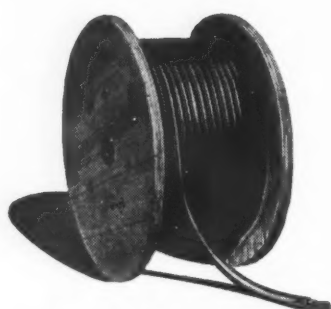
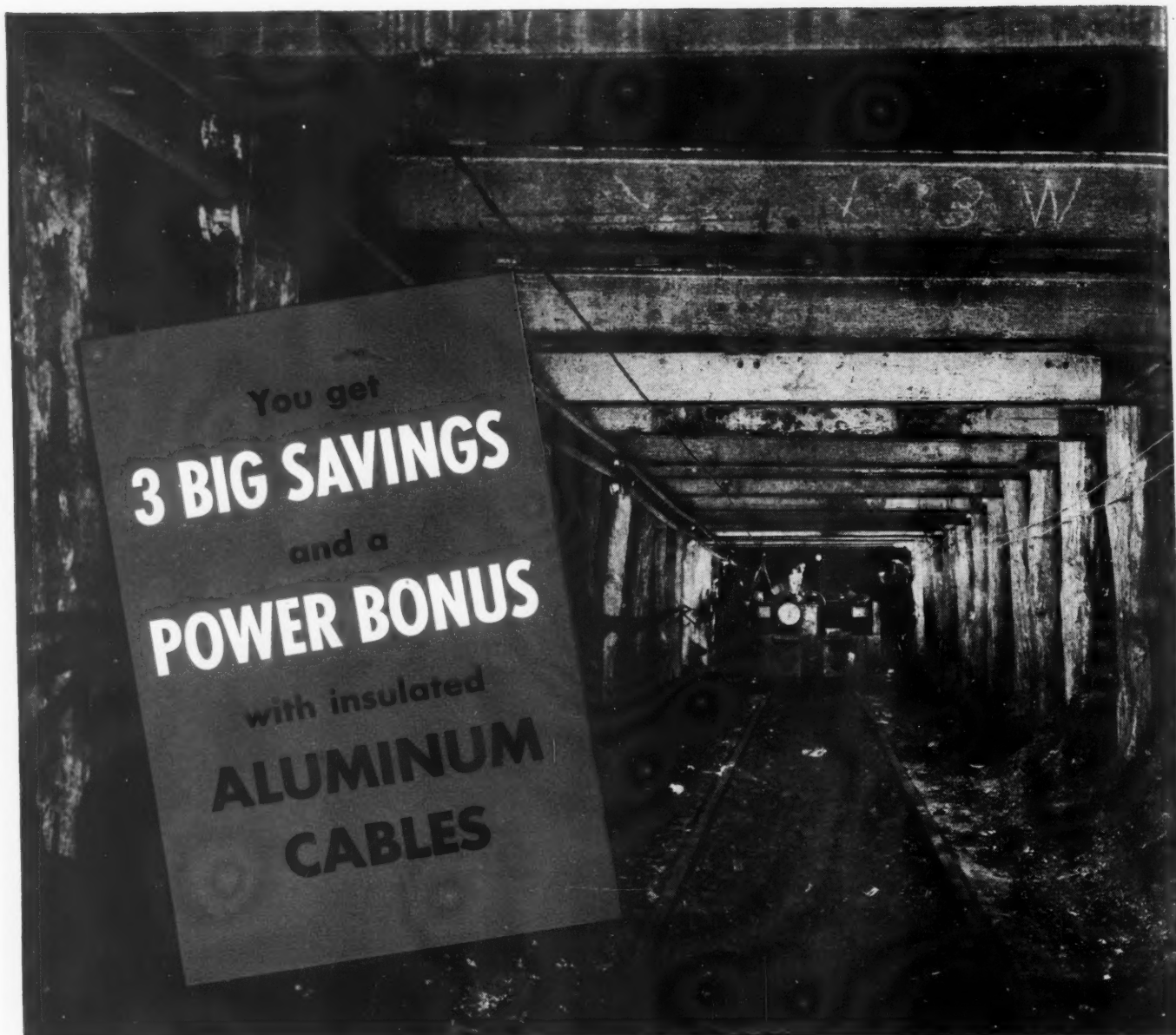
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"I can't keep up with these new A.C.F. mine cars. No mule could stand the pace they set. Shift after shift, month after month, they *never* seem to wear out! They don't even stop to unload—just dump on the move—then back down the slope again. They've made me nothin' but a has-been, as far as modern coal mining is concerned!"

a.c.f. MINE CARS

for Greater Coal Output



**The BIG DIFFERENCE
is in your COSTS!**

Power and feeder cables with Alcoa E.C.* Aluminum conductor cost less to ship, less to install, and a lot less to buy. Its lighter weight, for example, can mean only two men for installation where you used to use four. Lower transportation costs, too. And prices on bigger sizes can give you as much as 50% saving on cable costs.

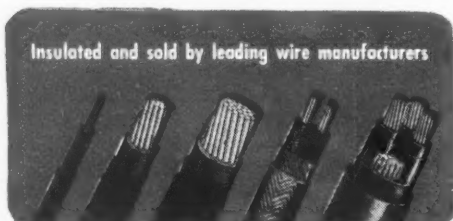
You can get a power bonus, too. The bigger sizes usually specified when aluminum replaces copper mean less voltage drop—more power to working

faces. Acid mine waters don't faze aluminum, either. On your next cable installation, ask your chief electrician to *figure it in aluminum*.

Alcoa makes light, strong, conductive E.C. Aluminum. Leading wire and cable manufacturers draw, strand, and insulate it, and sell it under their own trade-marks.

Ask your wire supplier about it, or write ALUMINUM COMPANY OF AMERICA, 1763 Gulf Building, Pittsburgh 19, Pennsylvania.

*E.C.: Electrical Conductor Aluminum



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ALCOA EC ALUMINUM



FOR ELECTRIC WIRE AND CABLE

MEETINGS

• Anthracite Section, A.I.M.E.: fall meeting, Oct. 15, Hotel Redington, Wilkes-Barre, Pa.

• National Safety Council: 36th National Safety Congress and Exposition, Oct. 18-22, Stevens Hotel, Chicago.

• Joint Fuels Conference—Fuels Division, A.S.M.E.: Coal Division, A.I.M.E.; and Central Appalachian Section, A.I.M.E.: Nov. 3-4, Greenbrier Hotel, White Sulphur Springs, W. Va.

• Illinois Mining Institute: 56th annual meeting, Nov. 5, Hotel Abraham Lincoln, Springfield, Ill.

• West Virginia Coal Mining Institute: 41st annual meeting, Nov. 19-20, Morgantown, W. Va.

pumps, "Low-Head" sludge dewatering screens.

McLanahan & Stone Corp., Hollidaysburg, Pa.—"Bantam Buster" and other coal-crushing equipment.

Ensign Electric & Mfg. Co., Huntington, W. Va.—Ensign rail bonds, cable splicers, Ensign-Clark d.c. motor starters, Ensign-Clark controllers, Louis Allis motors, Ensign spring-loaded centrifugal control switch, Ensign three-circuit distribution box and Ensign Bureau - of - Mines - explosion - tested d.c. motor starters.

Long Super Mine Car Co., Inc., Fayetteville, W. Va.—New Long 400R room conveyor with "suspended slack" for greater lengths and for operating through dips, 400U face conveyor with pans and "Superflite" chains interchangeable with room conveyors. All conveyor power units of 5- to 20-hp. are interchangeable.

Kennametal, Inc., Latrobe, Pa.—Kennametal cutter and drill bits, Kennametal mining tools.

Armco Drainage & Metal Products, Inc., Charleston, W. Va.—Mine ventilating fan ducts, tunnel, shaft and slope liner plates, culverts and other drainage products, sheets and "Steelex" portable buildings.

West Virginia Bearings, Inc., Charleston, W. Va.—Complete line of anti-friction bearings, Keystone anti-friction-bearing motor end bells and Owatonna maintenance tools.

Pure Oil Co., Bluefield, W. Va.—Lubricants and petroleum products.

Patrick Equipment Co., Charleston, W. Va.—Lowell wrenches, Thor shop tools, Thor Model-28 (30-lb) and Model-33 (30-lb.) pneumatic coal augers, Economy lifters and Chisholm-Moore Hoist Corp. products.

Harris Pump & Supply Co., Charleston, W. Va.—Marlow Type EM mine gathering pump with diffuser priming.

Friden Calculating Machine Agency, Roanoke, Va.—Friden automatic calculators.

Victaulic Corp. of America, New York—Speed-type flexible couplings and full-flow fittings for pipe lines, "Vic-groover."

Pittsburgh Gear & Machine Co., Pittsburgh, Pa.—Replacement gears, sprockets, shafts and other parts for mining machinery.

Electro-Nite Carbon Co., Philadel-



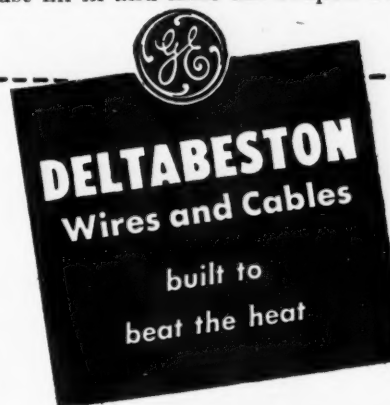
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When busy motors won't permit "cooling off" periods, where motor overloading is unavoidable, where motors can't escape high ambient temperatures, wind them with Deltabeston magnet wire. Heat-beating Deltabeston is built to "take it" in places where temperatures are really hot.

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Please send me the free booklet on heat-beating Deltabeston magnet wires.

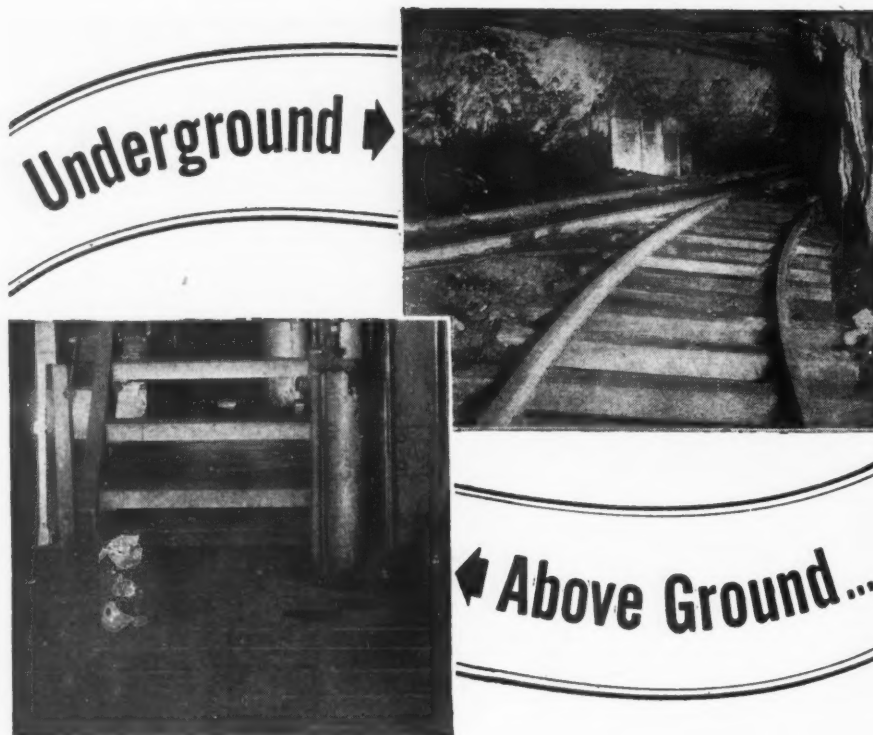
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GENERAL  ELECTRIC



"CZC"-treated timbers and ties save you money!

REDUCE MAINTENANCE COSTS: Timbers and ties treated with Chromated Zinc Chloride resist decay . . . retard fire. Replacements and repairs due to crushing, fire, and decay-weakened props are reduced.

INCREASE SAFETY: Treated timbering provides safety factors at the lowest cost—helps to eliminate dangerous roof falls and derailments. Because "CZC"-treated wood resists fire, it helps to reduce operating hazards which may occur by igniting of timber.

LONGER SERVICE: Treated timbers and ties usually outlast untreated timbering 5 to 9 times! "CZC" makes them more durable, better able to withstand continued usage.

Find out how "CZC"-treated timbering can result in greater safety and lower operating costs in your mine. Write to E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.



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Chromated Zinc Chloride
WOOD PRESERVATIVE



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in August, as follows:

Jeffrey Mfg. Co.—Type L600 loading machine; one motor, 60 hp., 500 volts, a.c.; Approval No. 2-631A; Aug. 11.

Yeager Mfg. Co.—Yeager cleaner; one motor, 5 hp., 250 volts, d.c.; Approval No. 2-632; Aug. 13.

Joy Mfg. Co.—Type 8BU-13AE/F loading machine; one 15-hp. motor, 250/500 volts, d.c.; Approval Nos. 2-633 and 2-633A, respectively; Aug. 27.

Joy Mfg. Co.—Type 8BU-17KK loading machine; one 15-hp. motor, 550 volts, a.c.; Approval No. 2-634; Aug. 31.

Lee-Norse Co.—Type RJ1-2 utility truck, battery operated; one motor, 3 hp., 96 volts, d.c.; Approval No. 2-635; Aug. 31.

phila, Pa.—Carbon brushes and carbon products.

Owens-Corning Fiberglas Corp., Toledo, Ohio—Fiberglas electrical insulation.

Ashland Oil & Refining Co., Ashland, Ky.—Lubricants, "Permatreat" coal-spraying oils.

W. O. & M. W. Talcott, Inc., Providence, R. I.—Talcott belt fasteners for transmission and conveyor belts.

Link-Belt Co., Chicago—"Electro-fluid" drive, herringbone, worm and helical gear speed reducers, belt idlers, roller bearings and "CA" vibrating screens.

Smith Welding Equipment Corp., Montclair, N. J.—Welding and cutting equipment.

Bluefield Supply Co., Bluefield, W. Va.—Mine, mill and electrical contractors supplies and equipment, hardware, heating, plumbing and appliances.

Rish Equipment Co., Bluefield, W. Va.—Ingersoll-Rand "Mobil-Air" portable compressor, McCarthy horizontal and vertical rock and earth drills, Euclid dump trucks, Barber-Greene belt conveyors, elevators and loaders, Hough dump buggy, International diesel engines, "Ready-Power" engine-generator, "Construction Machinery" cement mixers, Skill electric portable saws and drills, Wisconsin gas-generator sets, "Master-Vibrator" hammers.

Cunningham-Lewis Co., Roanoke, Va.—Sand dryers.

Johns-Manville Co., Cincinnati, Ohio, and Charleston, W. Va.—Industrial and building materials, "Transite" pipe, insulating brick, packing and gaskets, Goetze metallic gaskets, friction and electrical materials.

Gates Rubber Co., Denver, Colo.—"Vulco" rope drives and new "Yellow" mine hose.

Mosebach Electric & Supply Co., Pittsburgh, Pa.—Welders, "Mescoweld" rail bonds, line materials, trolley harps and fittings, feeder and trolley-wire switches, trolley taps, mine signal system using mercury switches, other electrical products for mines.

West Virginia Steel & Mfg. Co.,

They add up

TO LONGER LIFE FOR GUARANTEED PITTSBURGH ARMORED GEARS



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LABORATORY CONTROL OF
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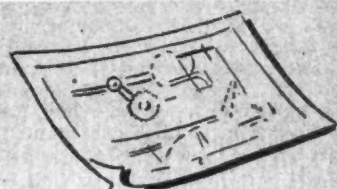
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2

ENGINEERING AND
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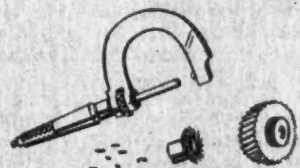
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STRICT ADHERENCE TO
SPECIFICATIONS . . .

PLUS



4

CAREFUL INSPECTIONS

PLUS



5

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GEARS AND PARTS FOR LOADERS, CUTTERS, LOCOMOTIVES

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FIRE EXTINGUISHERS MORE EFFECTIVE • MORE ECONOMICAL NON-TOXIC FIRE PROTECTION

Ansul Dry Chemical Fire Extinguishers give you more protection... pound for pound... dollar for dollar... than any other extinguisher of comparable size. In addition... Ansul Fire Extinguishers provide the best first-aid protection:

For all hazards involving electric wiring and equipment.

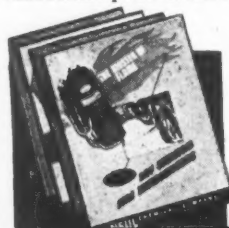
For hazards on mining machines involving lubricating oils, greases and flammable liquids.

Ansul Fire Extinguishers have the highest established ratings for effectiveness on flammable liquid fires, based on tests by nationally recognized approval agencies. The longer range stream of dry chemical is effective in winds and drafts.

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Safe to use... non-toxic, non-corrosive, non-abrasive.

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DISTRIBUTORS IN ALL PRINCIPAL CITIES

Huntington, W. Va.—Steel ties, pre-fabricated track, frogs, switch throws and other track materials.

Ingersoll-Rand Co., Pittsburgh, Pa.—Pneumatic tools, rock drills, riveters, "4-U" electric impact tool and permissible mine compressor.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.—Paints.

American Blower Corp., Cincinnati, Ohio.—"Gyrol" fluid drive, ventilating fans, unit heaters.

General Electric Co., Schenectady, N. Y.—Insulation materials, "Delta-boston" wire and cable, maintenance renewal parts, EWF resistors, MR circuit breaker, a.c. and d.c. welders and supplies, high-intensity mercury-vapor lamp for picking tables, 6-volt sealed-beam headlights for mine locomotives and other mobile equipment, incandescent and fluorescent lamps.

Industrial Products Co., Pittsburgh, Pa.—Ware "Hi-Lag" fuses and "Adal-et" conduit fittings.

Marathon Coal Bit Co., Montgomery, W. Va.—"Marathon" cutter bits, Timken rock bits, Universal safety clamp, keyway cutting attachment for shaper, "Union Melt" rebuilt locomotive tires, rebuilt machine parts.

Enterprise Wheel & Car Corp., Bristol, W. Va.—Tenn.—Low-type mine car borrowed from American Coal Co., McComas, W. Va.

Hendrick Mfg. Co., Carbondale, Pa.—Perforated metal screens including flanged lip screens and "Wedge-Slot" dewatering screens, grilles, grating and horizontal screens.

Barber-Greene Co., Aurora, Ill.—Mine belt conveyors.

Southern Oxygen Co., Inc., Arlington, Va.—Victor cutting and welding equipment, Sight-Feed Generator Co. welders, CO₂ fire and fog equipment, National carbide, Acme all-purpose gas mask, Scott "Air-Pak" oxygen apparatus, goggles, masks, welder's supplies, Stooddy hard-facing alloys, Alloy Rods Co. products, new TDS-7 "Tramdrill," all electrically controlled and self-propelled.

Femco Mine Communication System, Pittsburgh, Pa.—Femco trolley, phones and Femco permissible blasting unit.

Dixie Appliance Co., Bluefield, W. Va.—See Femco Mine Communication System.

Mines Equipment Co., St. Louis, Mo.—Joy blower fans, cable vulcanizers, cable connectors, ground-trip relay attachment to safety circuit centers.

Chicago Pneumatic Tool Co., New York—CP hand-held and post-mounted coal drills.

Princeton Foundry & Supply Division, Princeton, W. Va.—"Perfection" cone-stove sand dryers.

Graham White Mfg. Co., Princeton, W. Va.—See Princeton Foundry.

Linde Air Products Co., New York—Mining applications of cutting and welding equipment, Linde oxygen and acetylene, Union Carbide carbide, "Unionmelt" for mine locomotive tire build-up, Oxweld cutting and welding equipment.

Texas Co., Norfolk, Va.—Alcaid oil, Crater compound, Starfak and Olympian greases, heavy-duty engine oils, Marfak chassis and bearing lubricant, motor-cup greases, rust-proof compound and other mining lubricants.

Tamping Bag Co., Mt. Vernon, Ill.—"Super Seal-Tite" tamping bag made from wet-strength paper for minimum loss in transit and use; rubber-tired utility tractor and bulldozer for underground use in maintaining shuttle car



GOING OVER WITHOUT A **BANG!**



Using an oscillograph to measure the accuracy and precision of timing of AMERICAN Split-Second Electric Blasting Caps.



For better breakage with minimum vibration... AMERICAN Split-Second Electric Blasting Caps

With a *c-cruump* instead of a *bang*, AMERICAN Split-Second Electric Blasting Caps give a close sequence of explosions in one general blast—resulting in better fragmentation with minimized vibrations.

These Split-Second Electric Blasting Caps were developed and perfected by AMERICAN research. They are produced with great technical skill by the

most modern manufacturing methods...and are available to meet your specific blasting needs. Their use helps you obtain increased tonnage of properly sized material . . . placed where you want it . . . with maximum speed and economy.

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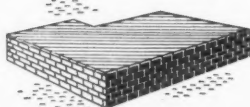
Test your know how:



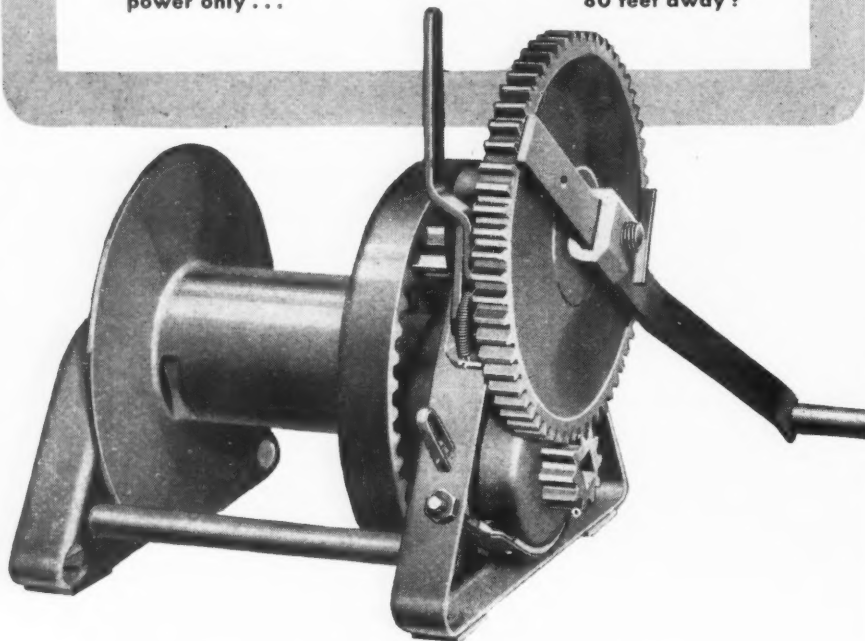
Can one man,
with muscle
power only...



move these
12"x12" timbers...



on to this
platform
80 feet away?



The job's a cinch...with **HANDIWINCH**

● On jobs of this kind... on any lifting or pulling job up to 10,000 pounds... you simply can't stump the HANDIWINCH. Here's how one man will handle this one:

(1) He'll carry HANDIWINCH (only 95 lbs.) to the platform.
(2) He'll anchor it with the handy demountable tail yoke. (3) Then he'll run his rope to the timber, make a simple hitch and haul away. Another job licked!

Have your distributor show you the all-steel construction... cut gears... two power ratios... strong, dependable hand brake... the many "big hoist" features that make HANDIWINCH the most powerful and helpful small winch at work today. Or write for new folder, with many suggested set-ups showing how HANDIWINCH, teamed with one man, can do the work of a crew.

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SAN FRANCISCO



For Armored Construction... specify
**AMERICAN BLOCKS
AND SHEAVES**

A wide line of wire rope blocks—many types, all sizes, in capacities from 1½ to 250 tons. Thick steel side plates, heavy pins and axles. Ask for American equipment when ordering.

For fastening wire
rope, use genuine
CROSBY CLIPS

Hot dip galvanized—high wings—grooved saddle—precision cut threads. To make sure you get genuine CROSBY CLIPS, look for the famous Red U-Bolt. All sizes—½ to 3 inches. Distributors everywhere.



roads and cleaning up; tamping poles with locking joints.

John A. Roebling's Sons Co., Trenton, N. J.—Wire rope and fittings, screen cloth, electrical wire and cable.

Ohio Carbon Co., Cleveland, Ohio—Brushes, commutator burnishers, repair kits and a complete line of carbon products.

Yale & Towne Mfg. Co., Philadelphia—Yale materials-handling equipment, including "Cable King" and "Midget King" wire-rope and chain hoists.

American Car & Foundry Co., Huntington, W. Va.—Rotary-dump mine car, 28 in. high, 108 cu. ft., built for Amherst Coal Co.

Duff-Norton Mfg. Co., Pittsburgh, Pa.—Mine roof and timber jacks, "Hy-Power" hydraulic jacks in 3- to 12- and 20- to 50-ton capacities, 15-ton aluminum track jack, new pin-timbering jack with hinged type head, new "Lo-Hite" 30-ton hydraulic jack, 50-ton portable air-motor power jack.

Jeffrey Mfg. Co., Huntington, W. Va.—C58 controller, Class 10 contactor magnetic switch, overload relay, reel resistance, A7 coal drill, CSS traction resistance, Class 21 headlight, reel switch.

Appalachian Electric Power Co., Bluefield, W. Va.—Products made by Appalachian Power customers.

Southern Office Supply Co., Bluefield, W. Va.—Remington-Rand business machines, Ohmer cash registers and Simplex time clocks.

Gulf Oil Corp., Pittsburgh, Pa.—Gulf mining-machine "Lubricant B" and other mining lubricants.

Kanawha Mfg. Co., Charleston, W. Va.—Kanawha preparation equipment and facilities.

Cardox Corp., Chicago—Cardox coal-breaking equipment and drills.

Charleston Electrical Supply Co., Charleston, W. Va.—Ohio Brass starters, distribution boxes and line materials, Deming pumps, Allen-Bradley starters, Anaconda wire and cable, "Cesco" coils, Weston instruments, Allis-Chalmers pumps, Good-year mechanical rubber goods, Ideal commutator maintenance equipment, Allis-Chalmers speed changers, and Allis-Chalmers "Magic-Grip" sheaves.

Ohio Brass Co., Mansfield, Ohio—See Charleston Electrical Supply Co. Deming Co., Salem, Ohio—See Charleston Electrical Supply Co.

Goodyear Tire & Rubber Co., Akron, Ohio—See Charleston Electrical Supply Co.

Weston Electrical Instrument Corp., Newark, N. J.—See Charleston Electrical Supply Co.

West Virginia Armature Co., Bluefield, W. Va.—Coils and brasses, Pittsburgh Gear & Machine Co. cut gears, trolley-line material, Westinghouse welding equipment, Allis-Chalmers Tex-ropes, Dolph paints, wire ropes.

Bearing Service Co., Pittsburgh, Pa.—Timken and McGill bearings, Torrington needle bearings, Bearing Service ball and roller bearings.

Goodman Mfg. Co., Chicago—Type 512EJH hydraulically controlled short-wall cutting machine with bugduster.

Templeton, Kenly & Co., Chicago—Simplex mine and shop jacks and tools, including multiple-purpose "Util-A-Tool" for lifting, straightening and other applications and the Simplex-Jenny center-hole hydraulic pullers.

Persinger Supply Co., Williamson, W. Va.—Reliance motors and Reliance V-S adjustable speed drives, Cutler-

This P&H Model 1600 (6 cu. yds.) owned by Fauzio Bros. is stripping anthracite coal at Tamaqua, Pa.



Again!
in the coal fields

...it's **P&H**

The second P&H Model 1600 purchased by Fauzio Bros. has the job of stripping overburden in the anthracite fields at Lansford, Pa.



• Why are so many owners ordering their second and third P&H Electric Shovels? Because they gain the Added Values which mean lower costs in the open pit. Take, for example, P&H electrical equipment — completely designed for shovel service — not adapted for it. Heavy-duty shovel motors are built to take the quick reversals. "Magnetron" Control — stepless — entirely eliminates electrical contacts, separate exciters and electrical surges. Generator response is instantaneous. Wiring throughout is reduced more than 40%! P&H has really given the kilowatts a new incentive.

Advanced electrical equipment is only one of many P&H Added Values. You should have the facts about all of them.

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plus "the Low Cost of Lifting"



No. 85A Simplex Ratchet Jack Raises Cutter Bar

Choose Simplex Mine Jacks for Safety First in all types of mine jacking. In addition you get easier operation, longer jack life and efficiency to lower your cost of lifting.

Check these important Simplex features: Drop forged, alloy steel heat treated parts — Precision machining — Expansion rivets instead of machine screws — Unbreakable trunnions — No fulcrum pins — Maximum strength with minimum weight.

Specify Simplex—get the benefit of the superiority which resulted in these jacks being awarded the only gold medal for the safety of jacks by the American Museum of Safety.

WRITE FOR BULLETIN MINES 47

Get this fully illustrated bulletin with detailed information on all Simplex Mine Jacks. In addition to those shown here these include: Post Pullers, Timber Jacks, Electrified Track Jacks, Journal Jacks, Anchor Jacks, Wire Tensioning Jacks, and the Simplex-Jenny Center Hole Hydraulic Puller.



BEARED JACKS
25 and 35-ton capacities. For heavy duty work such as raveling mine or railroad cars. Built for power, speed, ruggedness.

HYDRAULIC JACKS
3 to 100-ton capacities. Safety tested to 50% over capacity. Easy to operate, vertically or in horizontal position.



Simplex
LEVER • SCREW • HYDRAULIC
Jacks

GENERAL PURPOSE MINE JACKS

Single Acting — Ratchet Lowering

A Jack for every heavy duty mine job—5-to-35 tons capacity. All lift full capacity on cap or on the toe of Jack, a feature exclusive with Simplex!



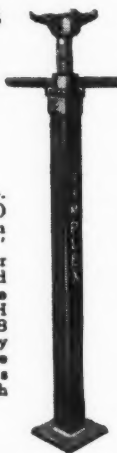
Adjustable MINE ROOF JACKS

MS, M9, M16 and M17

3 Types of Heads



Type "FS" Flat Swivel (on Jack at right) for use with wooden pieces. Type "C" (above left) for square and round timbers, and Type "FF" for small H beams and rails. 8 and 16-ton capacity models with square tubing or fittings only for use with round pipe.



Simplex PIN-UP JACKS

8 and 16-ton capacities with new type "FL" head—flat with lugs—for square tubing and round pipe. Eliminates the danger of knocking out posts. Enables loading machines to load out full cut. Unnecessary to re-set jack.

Hammer products, Aurora pumps, Yale & Towne products, Hartzell propeller fans, Quaker rubber products, including belts and hose, Webb truck and mine-car scales, Iowa Mfg. Co. "Cedar Rapids" conveyor and crusher, Eriez permanent magnets, Simplicity screens, Eberhardt-Denver speed reducers, Nagle pumps, Dodge couplings and conveyor pulleys, Gibraltar tools, CP coal drills, Schramm portable compressors, General Motors diesel power units with Reliance d.c. generators, Carver self-priming pumps, Quaker mine-drainage hose, Alemite lubrication equipment, Kalamazoo metal-cutting bandsaw, Ideal blowers and cleaners.

Quaker Rubber Co., Philadelphia, Pa.—See Persinger Supply Co.

Persingers, Incorporated, Charleston, W. Va.—See Persinger Supply Co.

Iowa Mfg. Co., Cedar Rapids, Ia.—See Persinger Supply Co.

Huntington Supply & Equipment Co., Huntington, W. Va.—Cincinnati cutter chains and bits, "Feralun" brake shoes, Tool Steel gears and pinions, Nolan feeders and dumps, Anchor re-railers, track braces and puller jacks, Hockensmith mine-car wheels, pipe rollers and sheaves.

American Brattice Cloth Corp., Warsaw, Ind.—"Mine-Vent" tubing and "ABC" brattice cloth.

United States Steel Corp., Pittsburgh, Pa.—Track equipment, rail bonds, wire rope, "Cyclone" fence, and other mining products.

American Steel & Wire Co., Pittsburgh, Pa.—See United States Steel Corp.

Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.—See United States Steel Corp.

National Tube Co., Pittsburgh, Pa.—See United States Steel Corp.

U. S. Steel Supply Co., Pittsburgh, Pa.—See United States Steel Corp.

Banks-Miller Supply Co., Huntington, W. Va.—Kremser conveyor equipment, Tirex cables, Coffing hoists, Gemco track equipment.

Buchanan-Williamson Supply Co., Grundy, Va.—See Banks-Miller Supply Co.

Williamson Supply Co., Williamson, W. Va.—See Banks-Miller Supply Co.

Cesco Mfg. Co., Homestead, Pa.—"Super" mine-bit forging machine and furnace, undercutting bits both all-alloy and tungsten-carbide insert, strip-mining bits, drills and augers.

Crucible Electric Steel Co., Homestead, Pa.—See Cesco Mfg. Co.

Marshall Equipment Co., Huntington, W. Va.—See Cesco Mfg. Co.

Westinghouse Electric Corp., Pittsburgh, Pa.—Locomotive, 8-ton, 26 in. "low," cable-reel type with cam-type controller, three-point suspension, built for Jewell Ridge Coal Corp.; instruments, splash-proof motors, gear motor, mine-locomotive headlights, coils, "De-Ion No-Fuse" circuit breakers, line materials, incandescent and fluorescent lamps.

Rockbestos Products Corp., New Haven, Conn.—Rockbestos "AVC" wire, cable and cord.

Ideal Industries, Inc., Pittsburgh, Pa.—New blowers and new industrial tank-type cleaners for continuous duty.

Joseph Dixon Crucible Co., Jersey City, N. J.—Silica-graphite and aluminum-graphite paint, maintenance floor enamel, belt dressing, graphite trolley-wire lubricant, graphite grease, pipe-joint compound, and special ball- and

TEMPLETON, KENLY & CO.

1040 South Central Avenue, Chicago 44, Illinois

**WHEN YOU'RE CUTTING MINING COSTS
GET TIRES THAT STRIP BEDS CAN'T CUT!**

THE GENERAL LCM



Thicker, heavier, tougher tread and protected side-wall resists cuts and snags from jutting rock. Heavy shock absorber plies "soak up" bumps that would bruise ordinary tires . . . make the General L. C. M. the longest lasting tire made for heavy hauling in rugged operations.

It rolls smoothly on the highway, without bumps or vibration . . . digs-in and gets going in mud or on unimproved roads . . . works equally well on front wheels, power wheels or free-rolling wheels.

The
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THE GENERAL TIRE & RUBBER CO. • AKRON, OHIO



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ROPE TROUBLES
OUT OF YOUR PICTURE
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"FIST-GRIP" SAFETY CLIP

*Only The Laughlin "Fist-Grip" Safety Clip Gives You
Service and Protection Like This:*

Won't Crimp or Crush . . . rope
lasts far longer

Simple, easy to put on . . . saves
time, manpower

100% Foolproof . . . can't go
on backward

Super Grip . . . two clips do the
work of three

Extra Strength and Safety . . .
entire clip, including bolts,
drop-forged

"Fist-Grip" Clips develop 95%
to 100% of the rope strength.
They can make important savings
in time, money and rope . . . for
you. Distributed through mine,
mill and oil field supply houses.
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industrial fittings.

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LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



roller-bearing grease for a wide range
of temperature.

Dayton Rubber Mfg. Co., Dayton,
Ohio—Dayton V-Belt drives.

Diamond Chain Co., Inc., Indian-
apolis, Ind.—Diamond roller chains,
sprockets and flexible couplings.

Timken Roller Bearing Co., Canton,
Ohio—Timken tapered-roller bearings.

B. F. Goodrich Co., Akron, Ohio—
Belt conveyors, rubber goods and
Koroseal brattice cloth and trolley
guards.

Continental Paint & Varnish Co.,
Chicago—Continental paints.

Blackhawk Mfg. Co., Milwaukee,
Wis.—High-pressure hydraulic equip-
ment, "Porto-Power" equipment, shop
and maintenance tools.

Van Dorn Electrical Tool Co., Tow-
son, Md.—Portable electric tools, valve
refracer and reseater, sanders, electric
hammers, portable saw.

Anaconda Wire & Cable Co., Cincin-
nati, Ohio—"Security-Flex" mining
cable.

Superior-Sterling Co., Bluefield,
W. Va.—Headlights, American reduc-
tion drive, belt drive and "Econ-O-
Matic" motor base, flexible tubing,
Theadwell keyway cutter, Flexco belt
fasteners, Esna stop-nuts, Timken
bearings and rock bits, S.K.F. ball-
bearing pillow blocks, Magnolia semi-
finish bronze, Burney electrical
connectors, Deltron trolley taps,
Chromalox resistor, and Miller-Knuth
portable power hack saw.

Socony-Vacuum Oil Co., Baltimore,
Md.—Mining lubricants.

Duquesne Mine Supply Co., Pitts-
burgh, Pa.—Tolley and line materials.
pole heads and fittings, skids and car
stops, feet and heads for jack pipes,
rerailers, trip drags, fused trolley taps,
cable protectors.

Safety First Supply Co., Pittsburgh,
Pa.—Dust respirators, Willson gas
masks, Scott "Air-Pak" oxygen ap-
paratus, Willson goggles, E & J
resuscitators.

Hawkes & Nitz Mfg. Co., Inc., Mont-
gomery, W. Va.—Powered mine truck
for transporting small supplies and
men, reversed trolley wire with self-
oiling sliding nip, ball-bearing rail
scooters for one man in low coal.

Baldwin Machinery Co., Charleston,
W. Va.—Buda 8-cylinder diesel engine,
1,200-r.p.m., 1,125-cu. in. displacement,
Model 8DCS1125 directly connected to
a 100-kw. 250-volt d.c. generator, which
unit furnished power for 17 exhibitors
after a motor-generator set of the
public utility company burned out from
overload; Jaeger pumps, Thor tools,
gasoline power unit, Macwhyte wire
ropes.

Roxbury Machine Shop, Inc., Johns-
town, Pa.—Fan signals, "Hot-Shot"
batteries, mine-car trip signals, safety
explosive boxes and hoist sheaves.

Simonds Steel & Mfg. Co., Boston,
Mass.—Saws, files and cutter blades.

Greene, Tweed & Co., North Wales,
Pa.—National Carbon Co. products,
Fafnir bearings, Greene-Tweed asbes-
tos packings, Favorite reversible
wrenches, Basa hammers.

National Carbon Co., Cleveland,
Ohio—See Greene, Tweed & Co.

Fafnir Bearing Co., New Britain,
Conn.—See Greene, Tweed & Co.

Black & Decker Mfg. Co., Baltimore,
Md.—Portable electric tools, bench
grinders, saws, electric hammers and
home utility sets.

General Cable Corp., Pittsburgh,
Pa.—Wires and cables.

Square D Co., Detroit, Mich., and

there's no *dozing* here

There's no "dozing" on the job with an Oliver "Cletrac" tractor. This hard-working, hard-hitting tractor with its Heil Trailbuilder is a tonnage booster for any pit.

Clearing walkways for the draglines and shovels . . . stripping overburden . . . cleaning off the seam . . . cleaning up around the shovels, pit and tipples . . . stock-piling coal and screenings . . . building and maintaining roads, this versatile tractor-dozing unit never gets a chance to "sleep on the job."

An Oliver "Cletrac" crawler tractor is a natural for pit operations. Its exclusive steering

principle with power on both tracks at all times, even on the turns, permits the tractor to handle off-center loads with ease. The pull of one track can be balanced against that of the other, eliminating the time-wasting, load-losing "jackknifing" required with ordinary tractors. With an Oliver "Cletrac," you can keep moving straight ahead with no wasted motion. And, since there is power on both tracks on the turns, it's a safer handling tractor on hills and rough ground.

For all the facts, see your Oliver "Cletrac" Dealer.

Cletrac

a product of

The OLIVER Corporation

INDUSTRIAL DIVISION: 19300 EUCLID AVENUE, CLEVELAND 17, OHIO



NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM



The Air Compressor You Like to Operate

compact

... no waste space, compressor and engine coupled into a single, rigid, permanently aligned unit ... balanced to reduce wear and increase efficiency!

lightweight

... Portables designed for quick handling to and from the job, stationary units vibrationless.

easy to start

... Just push the built-in electric starter, and the Compressor starts ... to give you a continuous amount of air.

TOOLS FOR THE JOB

Schramm Inc. also has a complete line of Pneumatic Tools to offer and recommend for operation by their Compressors.

These include Rock Drills, Paving Breakers, Trench Diggers, Clay Spades, Backfill Tampers, Tie Tampers, Sheet-Piling Drivers, Demolition Tools, Chain and Circular Saws.

Write for bulletins and prices.

... For these reasons users of Schramm Air Compressors have said they *like* to operate both stationary and portable Schramm units.

Other features, however, enter into the usefulness of Schramm. There's 100% water cooled feature, allowing you to operate Schramm perfectly both summer and winter; mechanical intake valve, forced feed lubrication, to mention a few.

Schramm features make them the Air Compressors ideal for your many jobs ... and the reasons they're specified North, East, South and West. Write today for data.

SCHRAMM INC.

THE COMPRESSOR PEOPLE, WEST CHESTER, PENNSYLVANIA

Milwaukee, Wis.—Square D controllers, circuit breakers, panel boards and pressure and float switches.

Smith & Barnett, Huntington, W. Va.—Ozalid direct dry-print process.

Gardner-Denver Co., Pittsburgh, Pa.—Air compressors, rock drills and sump pumps.

Elreco Corp., Cincinnati, Ohio—Open-type junction boxes, quick-break section insulators, new locomotive cable guides, overhead line materials.

National Mine Service Co., Beckley, W. Va.—New sealed-beam headlights, Wheat electric and Koehler safety lamps, Joy "Magnetox" controls, Universal trolley splicers, replacement parts for mine machinery, axle and journal liners, Bemco cable reels, Bemco intermediate gear, cable guides, NMS Type 45 and Type 68 controllers, brush holders, Hayden belt fasteners and other Bemco products.

Koppers Co., Inc., Pittsburgh, Pa.—Protective coatings for metal and for mine ribs and roof, "Plastipitch" protected metal.

Boston Wooven Hose & Rubber Co., Pittsburgh, Pa.—Conveyor belts and transmission belting, made by the "Rotocure" process of continuous vulcanization, friction tape, rubber hose.

Minnesota Mining & Mfg. Co., St. Paul, Minn.—No. 33 Scotch vinyl-plastic-backing electrical tape.

York Corp., Cleveland, Ohio—Refrigeration and air conditioning equipment including the automatic ice maker.

Trumbull Electric & Mfg. Co., Louisville, Ky.—Control centers, mine safety switches, mine circuit breakers, plug-in "Flex-A-Power" bus ways, trolley bus ways, motor starters.

Skilsaw, Inc., Chicago—Electric and pneumatic portable tools, radial Skilsaw.

Rust-Oleum Corp., Evanston, Ill.—Rust-preventive coatings.

Rubberset Corp., Fairfax, Va.—Paint brushes.

Bussman Mfg. Co., Greensboro, N. C.—Fuses and "Fusetrons."

The Akron Products Co., Seville, Ohio—"Tapco" mine jacks.

Osmose Wood Preserving Co., Buffalo, N. Y.—Osmose wood preservatives.

R. E. Gerdtz Equipment Co., Bluefield, W. Va.—Lee-Norse rubber-tired mine jeep, RJ1 Lee-Norse track mine jeep, Sterling Cast Steel Co. cast-steel wheels, miscellaneous steel castings, Victaulic pipe couplings, Red Star timber jack, "Peda-Spray" dispensers.

Sterling Steel Casting Co., East St. Louis, Ill.—See R. E. Gerdtz Equipment Co.

Lee-Norse Co., Charleroi, Pa.—See R. E. Gerdtz Equipment Co.

Walco Products Co., Pittsburgh, Pa.—See R. E. Gerdtz Equipment Co.

Appalachian Engineering Co., Bluefield, W. Va.—Acme "Tag-A-Long" mine-spray car, Johnson-March "Compound M" wetting agents, Hose-McCann sound-power mine telephones, "Drive-It" power tools, Steel Craft prefabricated metal buildings, Thor air and electric power tools including auger drills and jackhammers.

Independent Tool Co., Philadelphia—See Appalachian Engineering Co.

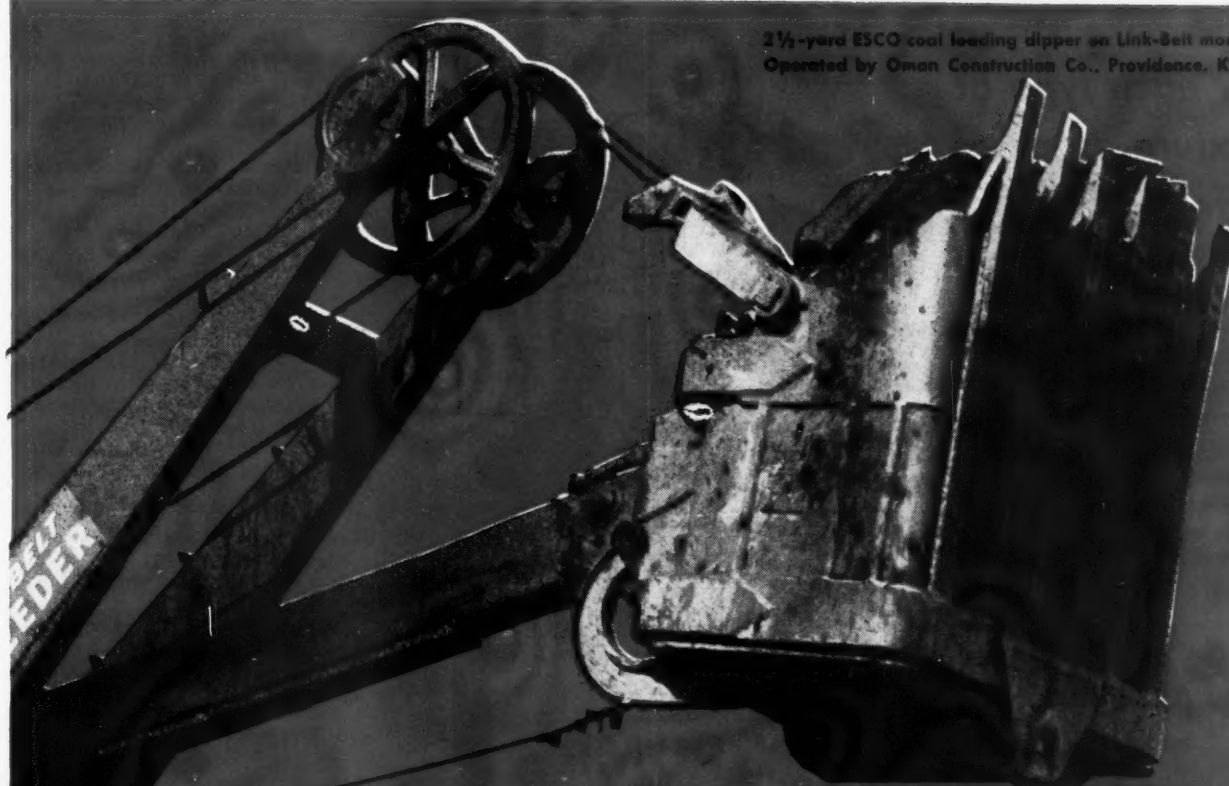
W. M. Hales Co., Hillsboro, Ill.—See Appalachian Engineering Co.

Hose-McCann Telephone Co., Brooklyn, N. Y.—See Appalachian Engineering Co.

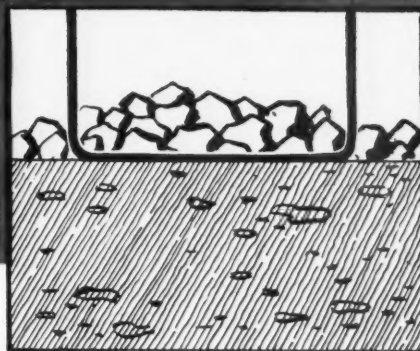
Johnson-March Corp., Philadelphia—See Appalachian Engineering Co.

Steelcraft Mfg. Co., Cincinnati, Ohio

2½-yard ESCO coal loading dipper on Link-Belt model 375.
Operated by Oman Construction Co., Providence, Kentucky.



Specialist in Oversize Loads of Coal



The shovel shown above is rated at 1¾ yards. But day after day it delivers 2½ yards of coal with every pass.

These oversize loads are made possible by the *ESCO* coal loading dipper. With this specially designed lightweight bucket your shovel power goes into payload. Even with greater loads the shovel is not overloaded, for no power is wasted on useless dead weight of the bucket.

Digs Clean and Fast

You leave less coal in the pit and pick up less dirt with *ESCO* coal loading dippers. The flat lip cleans up coal without gouging into the bottom as do curved front dippers. Long sharp teeth, placed close together, have only enough pitch to insure good cleanup.

Built for Long Service

ESCO coal loading dippers are solid, substantial buckets, able to move a mountain of "shot" coal without trouble or excessive maintenance and lost time. They are fabricated of tough steel plate with teeth, tooth holders, door hinges and latching mechanism cast of long-wearing, shock-resisting manganese and high alloy steel. Tooth holders are webbed type, welded together to form a solid cast lip.

ASK FOR DETAILED INFORMATION

Your nearest *ESCO* representative will be glad to give you detailed information about coal loading dippers or about *ESCO* stripping dipper and dragline buckets. Or fill in and mail the coupon below. Electric Steel Foundry, 2179 N.W. 25th Avenue, Portland 10, Oregon, and 728 Porter Street, Danville, Illinois. Offices in Eugene, Oregon; Chicago; Honolulu; Houston; Los Angeles; New York City; San Francisco; Seattle and Spokane. In Canada, *ESCO* Limited, Vancouver, B.C.

ELECTRIC STEEL FOUNDRY

2179 N.W. 25th Avenue, Portland 10, Oregon

Please send additional information on: ☐ coal loading dippers;
☐ stripping dippers; ☐ stripping draglines.

Name _____

Address _____ Zone _____

City _____ State _____

Make and model of machines used _____

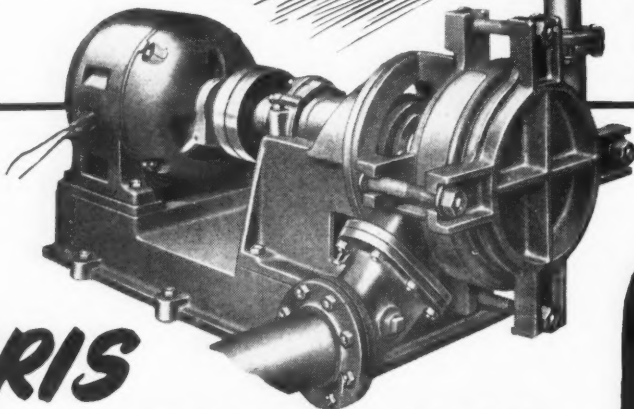
ESCO

DIPPER AND DRAGLINE BUCKETS

For each type of
mixture, parts of
different
alloys



Assure greater wear
resistance to each slurry
... and longer pump life
with less maintenance.



MORRIS Type R SLURRY PUMP

Naturally, the rate of wear in a solids handling pump is dependent upon the capacity, head and speed. Most pump manufacturers meet these requirements. But Morris gives you something more.

Morris makes its wearing parts in various metals, all differing in composition and hardness. After Morris Engineers analyze your particular slurry, they recommend that metal best suited to your mixture. This assures parts with greater corrosion and abrasion resistance. For example—

One metal used in coal mining installations is Morris Flintmetal "S"—a hard, stainless, high chrome iron, Brinelling between 600 and 700. This metal has greater corrosion and abrasion resistance to slurries containing traces of sulphuric and sulphurous acid.

**Other features of the Morris Type R
assure longer hours of continuous
operation at low cost operation**

Easily Dismantled—Impeller and shaft sleeve can be renewed without disturbing the suction and discharge piping.

Gland under suction pressure only—Reduces packing trouble to an absolute minimum. Less leakage, less dilution of mixtures.

Has no internal studs or bolts—This too reduces maintenance trouble and risk of shut-downs.

Shell interchangeable for right or left-hand rotation. Permits 72 different combinations of suction and discharge nozzles.

WRITE US for specifications and operational data on Morris Pumps best suited to your particular needs. Information free.

MORRIS MACHINE WORKS

Baldwinsville, N. Y.

Branch Offices in Principal Cities

MORRIS

Centrifugal Pumps

—See Appalachian Engineering Co.
Better Finishing & Coating Co.,
Newark, N. J.—See Appalachian Engineering Co.

Magnatrol Valve Corporation, New York—See Appalachian Engineering Co.

Powder Power Tools Co., Portland, Ore.—See Appalachian Engineering Co.

Smith Gates Corp., Plainville, Ohio—See Appalachian Engineering Co.

Kersey Mfg. Co., Bluefield, Va.—Model 444 "Lo-Coal-Motive" rubber-tired battery mine locomotive 24 in. high.

West Virginia Steel Corp., Charleston, W. Va.—Lincoln arc-welding equipment, Wells metal-cutting band saw, Stran Steel framing, aluminum cash, Atlantic tool steel.

Geo. W. McCullough, Bluefield, W. Va.—Quonset buildings and Stran-Steel framing.

Acme Machinery Co., Williamson, W. Va.—Acme mine compressors.

Barber-Greene Co., Aurora, Ill.—Conveyors for inside and outside duties at mines.

Fairbanks, Morse & Co., Cincinnati, Ohio—Scales and pumps.

Gorman-Rupp Co., Mansfield, Ohio—Mine gathering pumps and engine-driven pumps.

Clary Business Machines Agency, Roanoke, Va.—Adding machines.

Walter Kidde & Co., Charleston, W. Va.—Fire-control mine car and portable CO₂ extinguishers.

United States Rubber Co., Cincinnati, Ohio—New "Royal Gold" locomotive and mining-machine cable; wires and cables for mining service.

Ames-Baldwin-Wyoming Co., Parkersburg, W. Va.—Shovels.

Wm. S. Bolden Co., Charleston, W. Va.—DeWalt universal radial saw, Lombard power chain saws, Crescent saws, Ohio heavy duty shaper, Canedy-Otto radial drill, Williams tools, Brown-Sharpe tools, South Bend lathe, K. O. Lee universal tool and grinder, Firth-Sterling tool steel, stainless steel and new coal cutter and drill bits; Rodgers hydraulic forcing press.

Syntroon Co., Homer City, Pa.—Vibratory feeders and screens and electric tools.

Cummins Diesel Sales & Service, Inc., Charleston, W. Va.—Cummins diesel engines.

Bertrand P. Tracy Co., Pittsburgh, Pa.—Tracy cutter chains and sprockets for all types of cutting machines, locomotive gears, and pinions; replacement parts for cutting machines.

Union Wire Rope Corp., Kansas City, Mo.—Wire ropes.

American Cyanamid Co., New York—Mine explosives.

Anchor Sales Co., Beckley, W. Va.—J. & L. mine ropes, Alcoa pipe and mine timbering beams, new Bostrene plastic brattice cloth, Boston Woven Hose conveyor belts and hose, Christolm-Moore hoists, Gibraltar track tools, Breeze permissible magneto-type multiple shot firer.

Plomb Tool Co., Los Angeles, Calif.—Industrial and mechanics tools.

J. S. Schrenker, Library, Pa.—See Plomb Tool Co.

Sandvik Saw & Tool Corp., New York—Mine saws, files and other mine tools.

Flexible Steel Lacing Co., Chicago—New hinged Flexco conveyor belt fastener, Alligator wide belt cutter and standard Flexco and Alligator fasteners.

Esso Standard Oil Co., Bluefield,

How to take ups and downs with less friction

CARRYING 250 tons of coal per hour at a belt speed of 312 feet per minute on a 249 foot decline, this 1,485 foot-long conveyor is typical of the many heavy duty installations for which Robins Conveyors uses Timken-equipped troughing idlers.

Steep ups and downs in conveyors like this mean heavy wear and tear on the belts unless the idlers run freely. With Timken bearings, idlers roll easily under the heaviest loads—allow the belt to keep moving without drag or friction

and consequent chafing and fraying. What's more, this smooth, friction-less operation normally lasts the life of the conveyor, with minimum attention and maintenance expense.

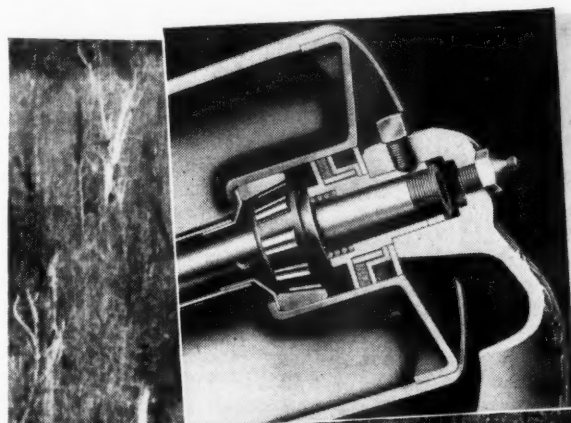
Because of the line contact between the rolls and races, Timken bearings have tremendous load carrying capacity. Their tapered construction allows them to handle both thrust and radial loads in any combination. Wear is negligible. Timken design permits the use of tight closures that seal lubricant

in—keep dirt, dust and water out.

No other bearing combines all the advantages of a Timken tapered roller bearing. No matter what equipment you use or make, the trade-mark "Timken" on the bearings is an assurance of long life, dependable performance and continuous trouble-free operation. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.



ROBINS CONVEYORS installs Timken roller bearings in heavy-duty troughing idlers as shown here. Triple seal guards against entry of moisture and dirt. Pressure gun lubricates all three idlers at one shot.



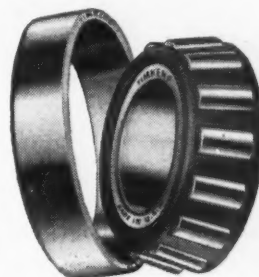
36" declining conveyor at Williams River Mine No. 1 of the Gaulley Mountain Coal Co. Speed: 312 ft. per minute. 250 tons of coal per hour.

TIMKEN BEARING CAPACITY RATINGS INCREASED 25%.

Since Timken bearings were last re-rated some 15 years ago there has been such a further and constant improvement in quality that we are now able to announce a 25% increase in radial and thrust load carrying capacity. This may make possible the use of smaller bearings with savings in bearing cost, material cost and weight. Engineers will be able to utilize the advantages of Timken bearings in more applications than in the past.

A new Timken Engineering Journal, now in preparation, will give you complete capacity rating tabulations. For further assistance, write us today.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
**TAPERED
ROLLER BEARINGS**

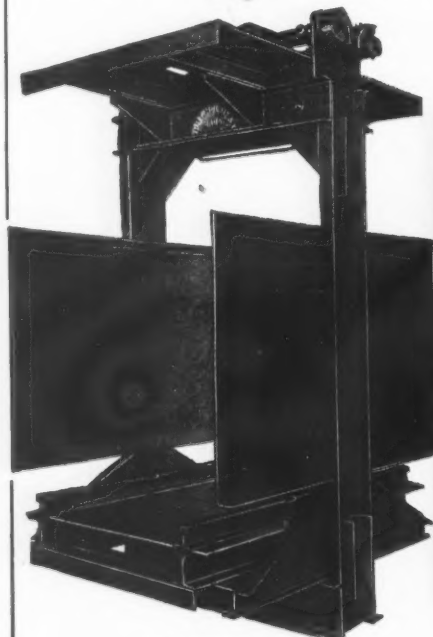


NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



WHETHER IT'S A SLEEK AUTO OR A HOLMES CAGE IT TAKES GOOD DESIGNING!

In HOLMES design all operating mechanisms have been simplified as far as possible, both to eliminate dead weight and reduce the percentage of delay from failure of some gadget to function properly. All operating parts are arranged for quick change with ordinary tools.

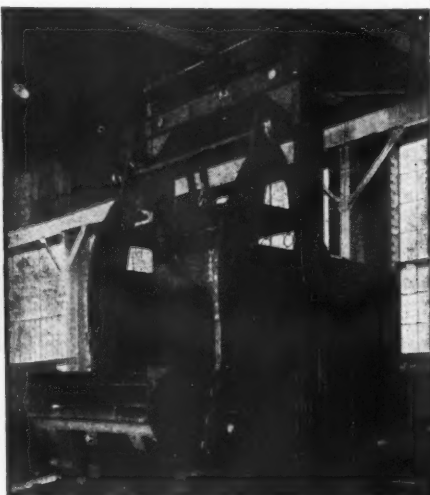


PLATFORM CAGE



SELF DUMPING

The car lock requires no special attachments on cars. It is also adapted for use with any of the standard automatic cagers.



Over Turning Type Cage for Use with Solid End Cars

ROBT. HOLMES & BROS., INC.
DANVILLE, ILLINOIS

W. Va.—Mine lubricants and gasoline. Barlow & Wisler, Bluefield, W. Va.—Winkler stoker.

Rumsey Electric Co., Roanoke, Va.—Delta-Star high-voltage switchgear, Allis-Chalmers Tex-rope drives, motors and pumps, Sangamo meters and time switches, Lapp insulators, Square D controls.

May Office Service, Beckley, W. Va.—Victor adding machines, Royal typewriters, Marchant calculators, steel office furniture and B. L. Marble business chairs.

West Virginia Tractor & Equipment Co., Charleston, W. Va.—Cardox-Hardsocg horizontal overburden drill.

Auto Car Sales & Service Co., Richmond, Va.—Autocar dump truck.

J. H. Smith Co., Huntington, W. Va.—See Auto Car Sales and Service Co.

Investigations Completed On Two Mine Accidents

Details of its official investigation reports on the explosion that killed 13 men and injured three others in the Kings mine of the Princeton Mining Co., Princeton, Ind., July 27, and the roof fall that killed six men and injured seven more at the No. 11 mine of the New River & Pocahontas Consolidated Coal Co., Capels, W. Va., Aug. 6, were recently released by the U. S. Bureau of Mines.

An ignition of methane by an electric arc from a non-permissible electric-drill truck was the probable cause of the explosion in the Kings mine according to the report. While the investigators emphasized that all available evidence indicated that the explosion was caused by an electric arc, they added that since cigarette lighters and other smokers' articles were found on some bodies, "the possibility that the ignition may have been caused by an employee smoking underground cannot be entirely discounted."

The report offers the following recommendations for preventing or minimizing explosions under similar conditions in bituminous mines:

1. Air that has passed by seals used to confine gas in worked-out areas should not be used to ventilate working places.
2. The air current at working faces and seals should, under any condition, have a sufficient volume and velocity to dilute and carry away flammable gas.
3. Doors should be used instead of curtains in buggy runways.
4. The use of doors for controlling ventilation should be eliminated as far as possible by the use of overcasts. However, where it is necessary to use doors, they should be installed in pairs to form an air lock in such a way that when one door is open the other will remain closed.
5. Doors should be kept closed except when men or equipment are passing through.
6. Examinations for gas should be made in all working places before electric equipment is taken into the



Saves \$1,200 a year on "Crack-the-Whip" Drive

"Cracking the Whip" is fun for the riders of a Pennsylvania Amusement Park, but it's one of the toughest drive applications. The fast starts, rapid accelerations and sudden stops cause ordinary belts to slip . . . burn and wear through.

Take the case of this Park Owner. During the 1946 park season, his "Whip" wore out 3 of the 40-foot, original-type belts. He had to replace them at a cost of \$400 each.

Then he called the Dayton V-Belt Distributor. His problem was studied. The power, speed and space limitation

analyzed. Recommendation: Use the old wood-flat driven pulley, install standard Dayton V-Belts and Dayton Motor V-Pulleys. Nothing "special" required. Result: After two years, no slippage, no burning, no wear through. \$1,200 a year saved.

When it comes to transmitting power, Daytons can do it better and save you money. Your local Dayton V-Belt Distributor has specialized knowledge and complete stocks.

For a better, more profitable solution to your drive problem, call your local Dayton V-Belt Distributor.

THE DAYTON RUBBER COMPANY

Main Office and Factory: Dayton 1, Ohio

Branch Offices: Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Los Angeles, Minneapolis, New York, Philadelphia, St. Louis

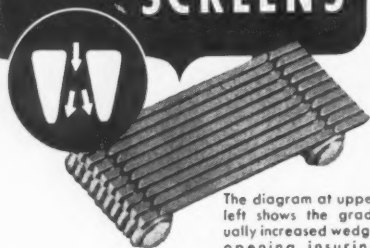


V-Belt Buyers! A leading mill supply house near you offers specialized Dayton V-Belt service. Look for the name under the trade name heading "Dayton V-Belts" in the yellow pages of your telephone directory.

Dayton Rubber

THE NAME OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

AMERICA'S *fine quality* PREPARATION SCREENS



The diagram at upper left shows the gradually increased wedge opening, insuring "clear" passage of material.

Wedge Wire KLEENZLOT SCREENS are non-clogging, non-blinding. They are strong, rigid and uniform in construction and possess a smooth even screening area. Also, they outwear ordinary screens of the same metal. Materials are cleared rapidly and efficiently. Net result — GREATER SUSTAINED PRODUCTION!

Wedge-Wire
CORPORATION
5602 CLARK AVENUE
CLEVELAND 2, OHIO

SEND FOR
OUR
ILLUSTRATED
CATALOG



Pittsburgh Smokeless-Coal Plant Nearing Completion

WITH ALL SEVEN of the 126-ft. carbonizers (above) in place, completion of the new \$3,000,000 Disco plant at Imperial, Pa., 19 miles west of Pittsburgh, is being pushed to meet some of Pittsburgh's peak winter demand for smokeless fuel. The new plant, which is being built by the Disco Co., a subsidiary of the Pittsburgh Consolidation Coal Co., will produce yearly an estimated 300,000 tons of "Disco," a smokeless distilled coal produced in a ball form from coal fines by a patented continuous process. Raw material will be obtained from the adjacent Champion cleaning plant of the Pittsburgh Coal Co.

places and at frequent intervals during the operation of such equipment.

7. Smoking should not be permitted in the mine, and the men should be searched for smokers' articles to assure that such articles are not taken into the mine.

8. The safety inspector should have no duties to perform other than looking after the safety of the men.

9. Electric equipment operated in face regions or in any other places where dangerous quantities of methane may be present or may enter the air current should be of the permissible type.

Failure to set timbers along a portion of mine haulageway where the roof was assumed to be "good" and the failure to make adequate roof examinations by the sound-and-vibration method were primarily responsible for the rock fall on three of the 14 cars of an out-going man-trip at the No. 11 of the New River & Pocahontas Consolidated Coal Co., according to the report of the Bureau's investigation.

The report's recommendations for preventing or reducing the number of this kind of accident include:

1. Haulageway roof should be examined during the working shift by the mine foremen for dangerous conditions. When found, such conditions should be corrected promptly by removing loose roof or rib, by adequate timbering or the duplication of timbering where necessary.

2. A greater effort should be made to expedite timbering the roof over the main-haulage roads.

3. Patrolling of haulage roads should be done more frequently so that workmen entering the main-haulage roads can be warned of the existing conditions.

4. Substantially constructed steel-covered man-cars of the small-capacity type should be provided for transporting men underground.

5. Additional examinations of the roof consisting of both visual observation and testing should be made

Backed by 25 Years Experience with Storage Battery Locomotives

THE GREENSBURG "CRUISER"

Operators say — "20%
MORE EFFICIENT
than average Storage
Battery Locomotives"



All Locomotives
CUSTOM-BUILT
to your requirements

FEATURES

2-motor drive; total 24 h.p.
Series parallel controller.

Extra long journal springs
for better trackability, road-
ability.

Oil-tight, leakproof transmis-
sion. Use auto oil, renew
once every 6 months.

Adjustable Timken Roller
Bearings throughout.

Strong, Simple construction.
Low maintenance cost.

MORE
HAULING
FOR LESS
STORAGE
BATTERY
CAPACITY

THE GREENSBURG MACHINE CO.

Makers of Custom-Built Storage Battery Locomotives

101 STANTON ST., GREENSBURG, PA.



NOW – An amazing new wood that resists fire!

Looks like ordinary wood, you say? Well it is wood. But not ordinary! It's a new kind of wood. Koppers has pressure-treated it with certain chemicals.

So what? So ordinary wood becomes amazingly different. It has far greater resistance to decay. It is completely unpalatable to termites. And get this: it is *fire-retardant!*

Yes, wood has joined the fire-safe materials! This Koppers Fire-Retardant Wood greatly reduces all fire hazards . . . has a high degree of resistance to the attacks of fire itself.

Thus, to all the advantages of wood . . . its easy workability, availability, decorative

value, economy, re-use value . . . are added resistance to decay and termite attack as well as resistance to fire. Yet the odorless Koppers treatment does not harm the color or paintability of the wood.

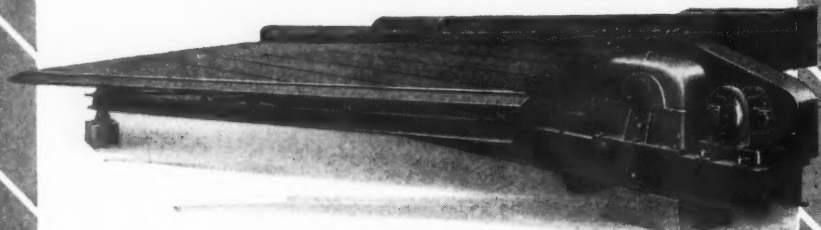
This amazing new wood that won't burn is ideally suited for floors, roofing, sheathing, and the structural members of plants, warehouses, docks, railroad engine houses, bridges, tunnel linings and similar structures. For more complete data, send for *Koppers Fire-Retardant Wood*, a new booklet containing interesting, helpful information about this latest development in pressure-treating wood.

KOPPERS COMPANY, INC. • Pittsburgh 19, Pa.



PRESSURE-TREATED WOOD

Field Facts PROVE SuperDuty Efficiency with "Out Front Performance"

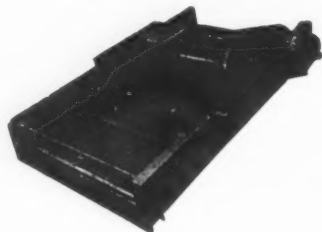


Records of stepped-up efficiency from coal operators—large and small—endorse the amazing performance of SuperDuty "Diagonal Deck" Coal Washing Tables.

Capacities once considered optimum are economically increased, while maintaining maximum recovery of good coal at attractive minimum low ash and sulphur figures. This "Out Front Performance" which adds up to greater profit for the operator has been achieved through the scientific application of sound engineering principles.

Exclusive with SuperDuty tables is the smooth Concenco anti-friction bearing equipped Head Motion, which is integrally mounted on the main frame and complements the advantages inherent in the Diagonal Deck. These features, plus matchless operating economy, definitely place this table in a class by itself.

For full information write for Bulletin 119.



FOR SCREENING ECONOMY

The Leahy Vibrating Screen possesses an uncanny ability to do a job right—and in record time. It screens wet or dry, using screen cloth or perforated plate. Excellent for fine mesh screening, dewatering or desanding. Range from 2" to finest mesh. Ask for Bulletin 14-H.

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either by the officials or competent authorized persons on each shift during the months when atmospheric conditions are changing.

Meanwhile, the state report on the explosion that killed 11 miners in the Edgewater mine of the T. C., I. & R. R. Co., near Birmingham, Ala., July 30, was released Aug. 26 by S. Fleetwood Carnley, director of the state Industrial Relations Department. The report, which was based on the findings of the Division of Safety and Inspection, attributed the blast to an ignition of methane that accumulated in an idle or temporarily abandoned section of the mine. Localizing of the explosion to that section of the mine resulted from the fact that the mine was well rock-dusted, the report pointed out. "The systematic and generous use of rock dust, which is general in the mine, was instrumental in saving many lives, as there were 316 men in the mine at the time," it said.

Faulty ventilation was thought to be the cause of the explosion, the report stated. Two days prior to the blast, it pointed out, a new air intake had been opened. This additional air had disrupted the airflow and permitted a large body of methane to collect in part of the 11 South slope. "This area was not fire-bossed or inspected for methane from the time of the interruption of normal airflow at 8:30 p.m. Thursday until the explosion at 9 a.m. Friday morning," Mr. Carnley asserted. Because of good housekeeping throughout the mine and the use of concrete stoppings instead of wood, there was no accumulation of material to feed serious fires, and the three small fires following the blast were quickly extinguished, the report continued.

Heat generated in the regulator of an air-contaminated cylinder of hydrogen during discharging operations was the "most probable source of ignition" that caused an explosion at the synthetic-liquid-fuels laboratories of the Bureau of Mines, Bruceton, Pa., Aug. 13, which killed two men and injured a third, according to the Bureau's official investigating committee. Several additional contributing factors were considered by the investi-

Setting the Record Straight

To complete the record on foremen's clubs (*Coal Age*, July, 1948, p. 74), J. S. Chapman, assistant to the manager, Mining Division, Armco Steel Corp., Montcoal, W. Va., writes that the Armco Mining Division's Foremen's Clubs were organized in November, 1945, and received their charter from the National Association of Foremen, Jan. 18, 1946, with groups at Montcoal, Stickney and Nellis, W. Va. The foremen's-club article in *Coal Age* had stated that the "first management clubs of this kind to be formed in the coal industry were those of the Island Creek Coal Co., Holden, W. Va., in October, 1946."

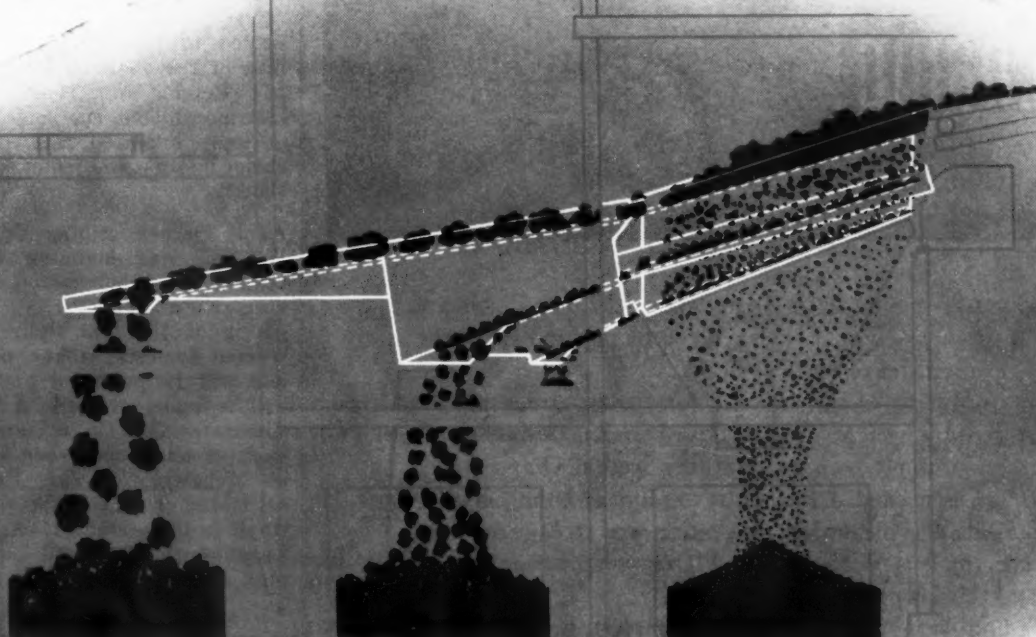
HERE'S TEAMWORK IN A TIPPLE!

**THE NEW SIMPLICITY
OSCILLATING CONVEYOR IN SERVICE
WITH SIMPLICITY SCREENS
IN COAL TIPPLES**



One of the recent Simplicity engineering achievements that has met wide approval in the coal production industry is the Simplicity Oscillating Conveyor. A recent installation includes a 3-deck Simplicity Oscillating Conveyor to deliver the coal to its proper chute without damage to sizes, after

being graded in a three-deck Simplicity gyrating screen. This Oscillating Conveyor delivers properly sized coal, without breakage, to loading booms. Our engineers will gladly study your coal production problem and suggest Simplicity Oscillating Conveyors and Gyrating Screens that will speed and simplify sizing and movement of coal at your tipple.



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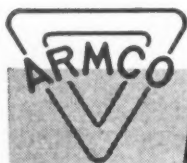


On a pound-for-pound basis ARMCO Tunnel Liner Plates are in a class by themselves. They save you money and speed the job on sloped entries or vertical shafts.

These sturdy plates are designed for utmost strength with the least possible weight. One unskilled workman can carry, hold and bolt into place an ARMCO Liner Section. Only a structural wrench is needed. Labor costs are low and the job goes fast. Less bulk also means less excavation, and storage requirements are smaller. With ARMCO Plates you buy no excess metal, and this keeps job costs down.

You'll find ARMCO Liner Plates the simplest, most inexpensive way you ever saw to construct better passageways from ground surface to working levels. They provide worthwhile durability and safety from fire hazards. Use these plates for sloped entries, air shafts, escapeways, substations, overcasts and wherever else you need the protection and other advantages of a steel liner. Write us for prices and complete information on your specific needs. Armco Drainage & Metal Products, Inc., 2205 Curtis Street, Middletown, Ohio.

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ARMCO TUNNEL LINER PLATES

gators, but the "exact source of ignition is not known," they said.

The hydrogen cylinder that exploded was one of several accidentally charged with air instead of additional hydrogen during re-charging operations at the coal-hydrogenation laboratory. As the contaminated cylinders contained a highly explosive mixture of about 40-percent hydrogen and 60-percent air, it was decided to release the compressed gas. Two of the cylinders had been successfully discharged and the explosion occurred during the discharging of the third, the report stated.

New Developments

•Development of the new Zeigler No. 3 mine of the Bell & Zoller Coal & Mining Co., Zeigler, Ill., which was opened early this summer, is reportedly progressing, with the installation of the main-line belt conveyor completed last month. The operation is a slope mine and is planned for an eventual capacity of 6,000 tons daily. The No. 6 seam is to be mined and coal will be cleaned in the No. 2 plant. The operation is being planned to replace Zeigler No. 1, which is expected to be exhausted around the first of the year. An air-shaft cave-in at Zeigler No. 1 stopped production last month, but company officials reportedly expected that it would be cleaned up and mining resumed shortly.

•The Tierney Mining Co., Bluefield, W. Va., was planning to open in October a new operation at Barbourville, Knox County, Ky., with a capacity of 500 tons daily. Only oil-treated domestic stoker, pea and carbon will be produced and shipments will be made via the L. & N. R.R. The Clarmatan Coal Co., a Tierney affiliate, is expected to open soon a strip mine at Mohawk, W. Va. Reserves are estimated at 2,000,000 tons, and a tippie is to be erected. A. M. Burton, Lynchburgh, Va., will be the strip-ping contractor.

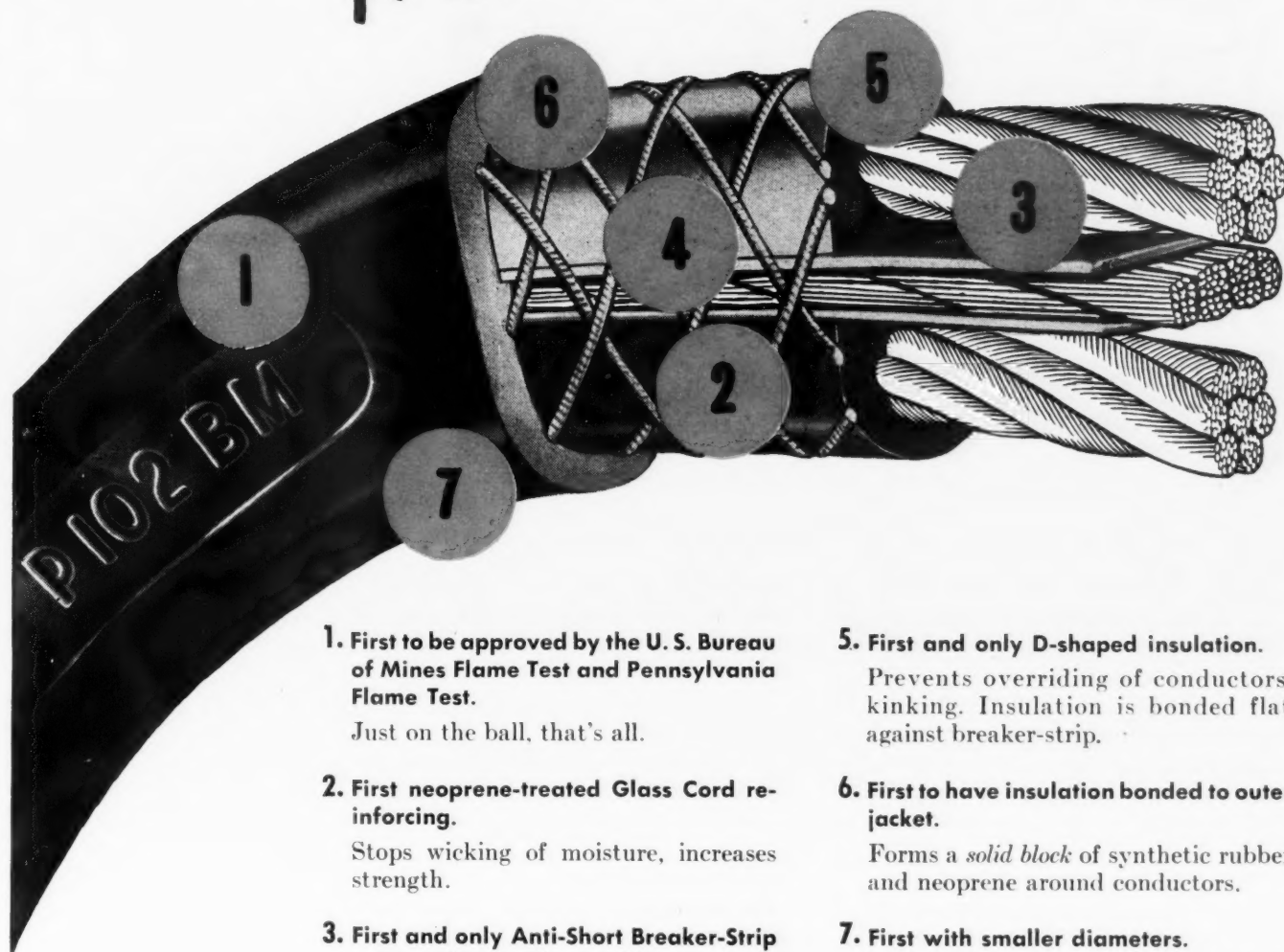
•Marmet Coal Co., Hernshaw, W. Va., is reported to be rebuilding its river tippie, with capacity being increased to 2,000 tons per day. Capacity of the mine is to be increased to 1,500 tons a day after delivery of a new Joy unit.

•The Morgan Creek Coal Co., affiliated with the Dudley Coal Co., Dudley, Pa., recently opened the Miracle mine at Peytona, Boone County, W. Va., on the C. & O. Ry. Capacity is to be 1,000 tons daily.

•A new deep mine is being developed by the Robinson Run Coal Co., Maidsville, W. Va. Coal reserves for both this new operation and the present strip mine are reported at 10 years.

•Saunders Coal Co., Greenview, W. Va., is planning to install a prepara-

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Just on the ball, that's all.

2. First neoprene-treated Glass Cord reinforcing.

Stops wicking of moisture, increases strength.

3. First and only Anti-Short Breaker-Strip construction (with or without ground wire).

Cuts short circuits between conductors.

4. First parallel mine cable with ground wire.

Four years ahead of the industry.

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Prevents overriding of conductors, kinking. Insulation is bonded flat against breaker-strip.

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Forms a *solid block* of synthetic rubber and neoprene around conductors.

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To pack more on a reel; for easier handling. Now adopted by U. S. Bureau of Mines.

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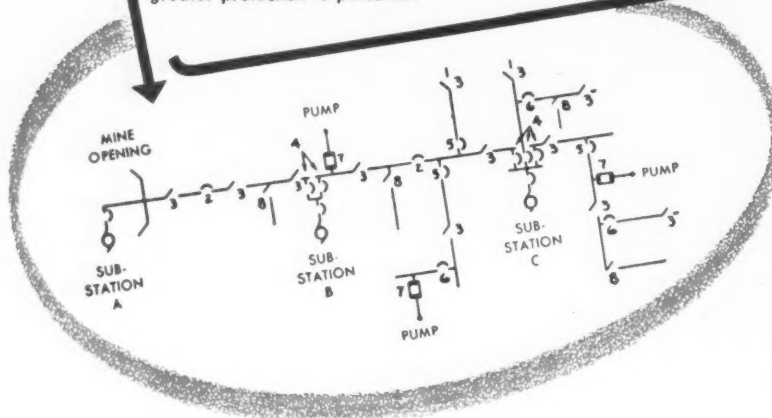


Boost Production Tipple-high- APPLY AN I-T-E SECTIONALIZING PLAN LIKE THIS



The diagram below shows a few applications of I-T-E Sectionalizing Switchgear to mine electrical distribution systems. We can offer you many recommendations for raising production levels, and for giving greater protection to personnel

and equipment. The I-T-E representative in your locality is fully qualified to assist you in adapting these sectionalizing recommendations for your mine. Use his services with no obligation.



Key

2. I-T-E Type KSC Automatic Reclosing Circuit Breaker installed as overcurrent protective device between each two substations. The KSC protects feeders and equipment by detecting disturbances on either side.
3. A disconnect switch or protective device placed at not over 1500-foot intervals in every power line.
4. I-T-E Type KSA Automatic Reclosing Circuit Breaker used as an overcurrent protective device in each circuit leaving a substation.
5. I-T-E Type KSC used as an overcurrent protective device in each main branch circuit. It is rugged and compact in construction, readily portable, and can be moved as mining progresses and centers of loads change.
6. I-T-E Type KSC used as overcurrent protective device in secondary branch circuits.

Key

7. Circuits to pumps and other fixed loads have overcurrent protection at their supply ends.
8. Unimportant branch circuits such as infrequently used entries, spur tracks, etc., have switches for cutting off all power.

NOTE: In every case, sufficient feeder and return circuit capacity should be provided so that the circuit breaker will be opened by a dead short at the most remote point of the circuit.

The Heart of Protection . . .  TYPE KSC

AUTOMATIC RECLOSING CIRCUIT BREAKER

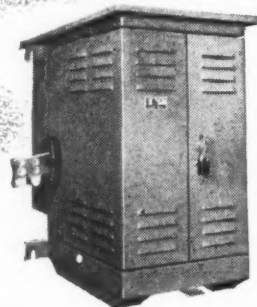
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The KSC was especially developed for the mining industry. It is completely metal enclosed for safety—yet readily accessible for inspections and maintenance. Overall height: 38 3/4".

tion plant, including a washery and a new rail siding to be constructed. The mine is developing to a capacity of 1,000 tons daily.

•Work on the Morgantown, W. Va., lock and dam, the first unit in the Monongahela River development plan, was expected to begin in September, according to an announcement by the army engineer in charge. The project, which includes a series of new locks and dams, will open the river to navigation 23 miles beyond its present limits, making vast coal deposits available for mining. Several steel companies have considerable acreage in the area and are reported to be planning large-scale developments. The river project is expected to cost \$24,000,000.

•Plans recently were announced by the L. & N. R.R. for the construction of a three-mile line from Colson, Ky., up Camp Branch Creek in Letcher County, Kentucky, to reach new properties of the Marlowe Coal Co., and the Elkhorn-Jellico Coal Co., which are expected to be opened for development soon. Present properties of the South-East Coal Co. also will be tapped by the new spur. The Marlowe company is understood to be planning a mine with a capacity of 2,000 tons daily.

•A contract for building 16 miles of rail line for the C. & O. Ry., from Royalton to South Fork, Breathitt County, Kentucky, has been awarded to the Codell Construction Co., Winchester, Ky. The new line, construction of which will require at least a year, is expected to open up large coal reserves in the area.

•The Colly-Elkhorn Coal Co., reported to be the operator of the largest truck mine in Letcher County, Kentucky, is understood to be purchasing \$100,000 in machinery and equipment for cleaning and sizing of its output and that of other nearby truck mines. The company's loading ramp also is to be enlarged to a capacity of 50 railroad cars daily and production is to increase in the near future.

•The Panhandle mine of the Bicknell Coal Co., Bicknell, Ind., has been acquired by Wolf & Koenig Corp. Operation of the mine was suspended in July following an air-shaft cave-in, but mining will be resumed as soon as possible, according to John Wolf, Edwardsport, Ind., president of Wolf & Koenig. Further mechanizing of the operation is expected, it is said.

•The new shaft and tipple recently under construction at the No. 5 mine of the Knox Consolidated Coal Co., Bruceville, Ind., was expected to be in use around the first of October, with the change-over from the original shaft and tipple under way.

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RECORD MAKER CONVEYOR BELTING, designed for heavy service and severe operating conditions, is recommended for rock and ore up to 4", run of mine coal, and many types of moderately abrasive materials.



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25th Anniversary

1948 marks the 25th Anniversary of Republic Rubber Division's 5-Point Sales Policy. This policy, by intent, provides service to industry through carefully chosen distributors rather than branches, because, Republic believes it's a more economical and efficient way of doing business.

The natural service facilities distributors have when augmented with "product knowledge" make distributors an economic necessity. "Product knowledge" plus "product availability" are essential points for buyers. Since Republic Rubber distributors furnish "product availability" to buyers and since Republic Rubber furnishes "product knowledge" to Republic Rubber distributors, it's a combination worth your consideration.



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WET or DRY...**



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Streamline blasting procedure with dummies made-up with Seal-Tite Tamping Bags. They're extra-tough to take the added strain of greater bulk and the rougher handling those big dummies get.

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National Safety Congress Plans Mining Sessions

"Be Careful. The life you save may be your own," has been announced as the theme for the 36th National Safety Congress and Exposition to be held in Chicago, Oct. 18-22 under the sponsorship of the National Safety Council. Sessions of the Coal Mining Section will be held in the Stevens Hotel on Oct. 18, 19, and 20, and are expected to attract many operating men from various parts of the country.

According to the preliminary program, the Coal Mining Section meetings will include the following papers:

"Important Phases in the Prevention of Haulage Accidents," by W. D. Northover, safety director, Rochester & Pittsburgh Coal Co.; "Prevention of Fatalities and Injuries From Track-Mounted Equipment," W. J. Schuster, safety director, The Hanna Coal Co.; "Prevention of Fatalities and Injuries From Shuttle Cars," K. K. Kincell, superintendent, Mine No. 63, Consolidation Coal Co. (W. Va.); "Conveyor Belt Fires in Bituminous Coal Mines," John H. Hansford, director, mine and safety rescue, West Virginia Department of Mines; "Important Phases in the Prevention of Accidents From Falls of Roof and Coal," G. W. Grove, supervising engineer, U. S. Bureau of Mines, Pittsburgh; "Methods of Roof Control at Face Regions and on Haulage Roads," Edward Thomas, mining engineer, U. S. Bureau of Mines, College Park, Md.; "Top Falls—Our Greatest Hazard," A. R. Harris, safety engineer, The Philadelphia & Reading Coal & Iron Co.; "Safe Timber Recovery and Fall Making Methods," George H. Sambrook, safety director, H. C. Frick Coke Co.; "Safety Efforts of the United Mine Workers in the Coal Mining Industry," Paul K. Reed, international representative, U.M.W.A.; "Safety Work of the National Coal Association," Earl R. Maize, director, safety division, N.C.A.; "Major Factors in the Prevention of Coal Mine Explosions," Ralph E. Kirk, manager of raw materials, T.C., I. & R.R. Co.; and "Electrical Fire Hazards in Coal Mines—Methods of Control," C. C. Conway, electrical engineer, Consolidated Coal Co.

Year's Safety Report Made to Congress

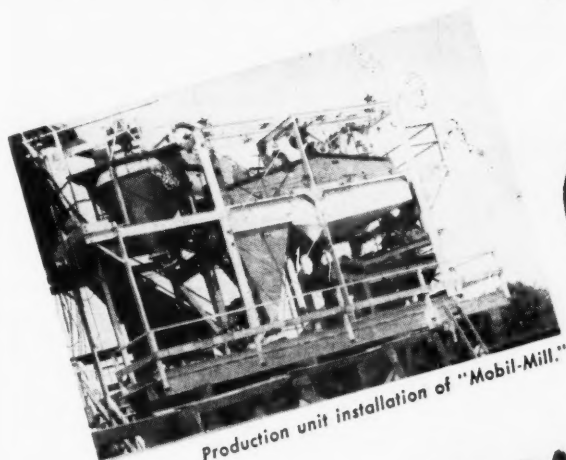
Approximately one-third of the violations of the Federal Safety Code reported by federal coal mine inspectors in the year ending June 30, 1948, were corrected completely and progress was made in eliminating another 15 percent, leaving about half still uncorrected, according to a report on safety in underground bituminous and lignite mines submitted Aug. 27 by Secretary of the Interior

WKE (HMS) "MOBIL-MILL"

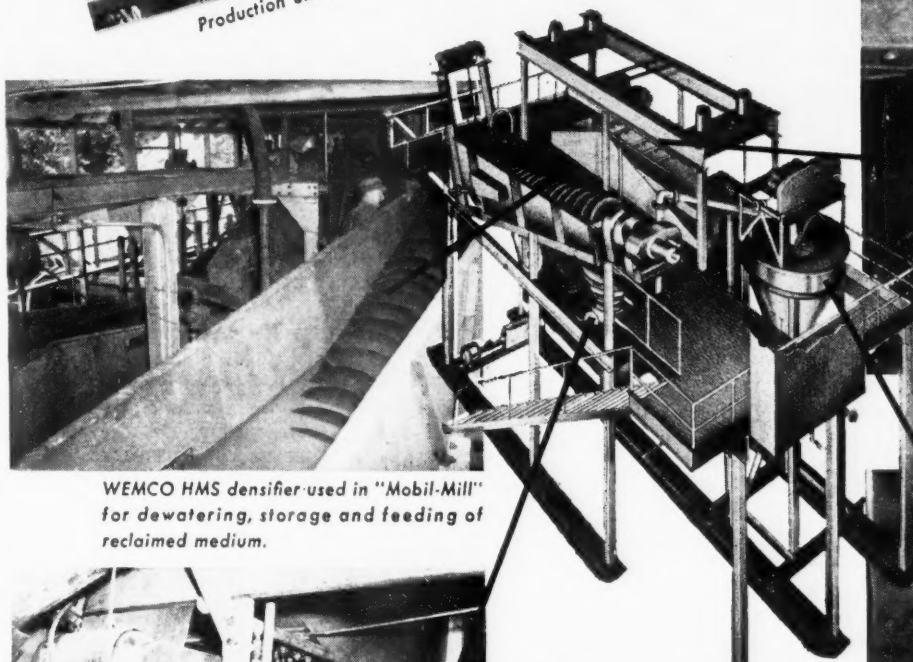
Gets Results!

"Mobil-Mill" production units are getting results—profitable results . . . in coal and mineral processing fields. "Mobil-Mills" are showing operators a new way to get production at greatly reduced costs.

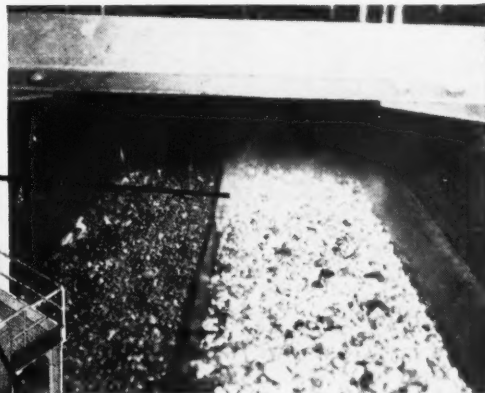
Write WEMCO for complete details on "Mobil-Mill"



Production unit installation of "Mobil-Mill."



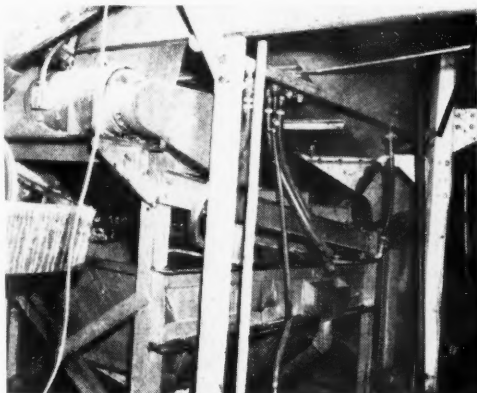
WEMCO HMS densifier—used in "Mobil-Mill" for dewatering, storage and feeding of reclaimed medium.



Product—medium washing screen showing refuse (left) and valuable mineral (right).



WEMCO HMS separation vessel in "Mobil-Mill" for separation of sink and float products.

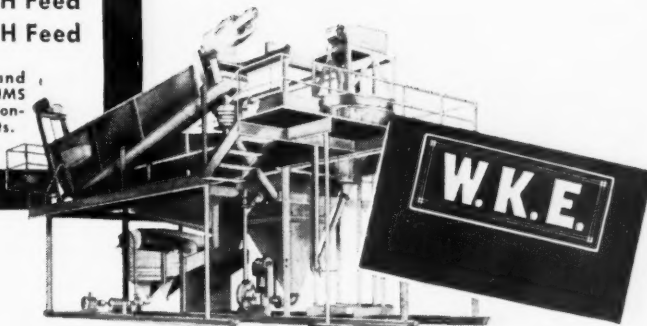


Magnetic separator section of "Mobil-Mill" for reclamation of magnetic medium.

Rent or Buy 4 SIZES

15-25	TPH Feed
25-35	TPH Feed
50-60	TPH Feed
90-125	TPH Feed

Also design and construction of HMS plants for any tonnage requirements.

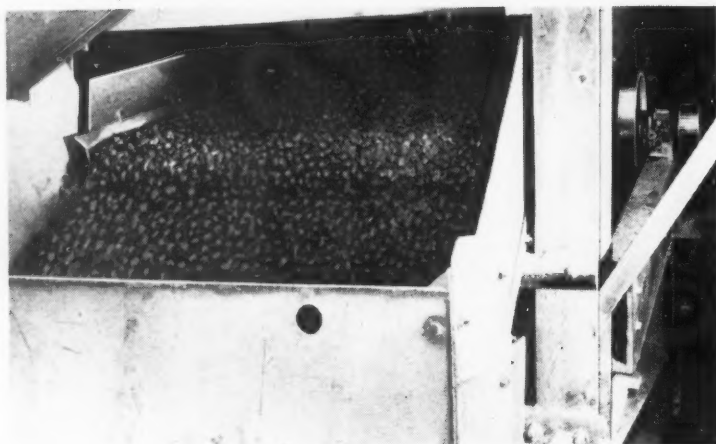


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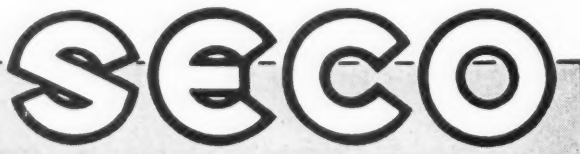
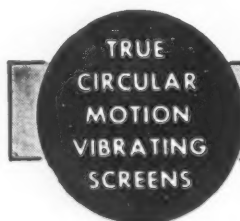


LAZY SPOTS?
No Sir!



it's a SECO VIBRATING SCREEN

Here's how to efficiently screen maximum tonnages of coal . . . month after month . . . year after year. Install a Seco Vibrating Screen . . . get the "workhorse" benefits of Seco's patented Equalizer Assembly. This advanced engineering principle sets up a fully controlled, true circular action which is equally distributed over the entire screen surface . . . eliminating "lazy spots" and accurately sizing your coal. Write for A Guide to Better Screening, Dept. CA4.



SCREEN EQUIPMENT COMPANY, INC.
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
Buffalo 21, New York

In Canada: United Steel Corp., Ltd., Toronto

Krug to Congress. Based on federal reports, the larger mines complied more readily than the small mines in eliminating hazardous conditions relating to important sections of the code.

Covering the entire fiscal year, the report is the fourth and last to be submitted to Congress under the one-year law that went into effect Aug. 4, 1947.

In reviewing the U. S. Bureau of Mines' training program for mine-safety committeemen, it was reported that approximately 2,000 committeemen and 1,500 other mine workers had completed the training course. An expansion of the training to take in the estimated 12,000 committeemen throughout the United States is contemplated, it was said.

More than 800 coal-mine supervisory officials had completed or were enrolled in a special accident-prevention course conducted by Bureau engineers during the last half of the year, it was pointed out. Eight mining engineers conducted the classes.

Anthracite Industry Sets New Safety Mark

With a fatality rate of 0.83 per million man-hours for the first half of 1948, "the anthracite industry stands an excellent chance of becoming not only a national but a world leader in the low number of fatalities" if the safety efforts of the industry continue to be as successful during the last half of the year, Joseph J. Walsh, deputy secretary of the Pennsylvania Department of Mines, pointed out last month. Nowhere in the annals of the department can it be found that this record has been exceeded, Mr. Walsh reported.

Compensation Rate Cut In West Virginia

The base rate paid by the coal industry in contributions to the West Virginia Workmen's Compensation Commission has been cut from \$3.50 to \$3.20 per \$100 of monthly payroll, it was announced Sept. 10 in Charleston. The change, which was the first in 14 years, resulted from increased wages bringing payments in faster than benefits were being paid.

Illinois Group Hears Phone Demonstration

As a feature of its Sept. 2 meeting, members and visitors of the Mining Electrical Group, West Frankfort, Ill., were able to listen in on a trolley phone in actual service in a nearby mine.

Prior to the demonstration, Farmers Engineering & Mfg. Co., Pittsburgh, Pa., described its "Femco Trolley-Phone" in detail, with an explana-

Barber-Greene



All-welded steel
Belt Carriers



Available in roller, ball or plain bearings
"Four-pass" grease seal protects bearings

EASY TO CHOOSE . . . EASIER TO USE! Belt Conveyors!



Barber-Greene "pre-engineering" simplifies your selection of the right, most economical belt conveyor set-up for your jobs. Standardized units—carriers, frames, take-ups, drives—are factory aligned, interchangeable. You can easily choose the units you need to make up a complete conveyor that's especially fitted to your material-moving problem. And, when they're delivered on the job, you'll find them plainly marked for quick installation with a minimum of "blueprint" work or on-the-spot fabrication. To gain these two big advantages—that have saved money for hundreds of Barber-Greene users—see your Barber-Greene distributor.



BARBER-GREENE COMPANY • AURORA, ILLINOIS

Constant Flow Equipment



LOADERS



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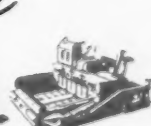
PORTABLE CONVEYORS



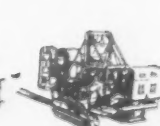
COAL MACHINES



BITUMINOUS PLANTS

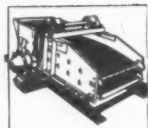


FINISHERS

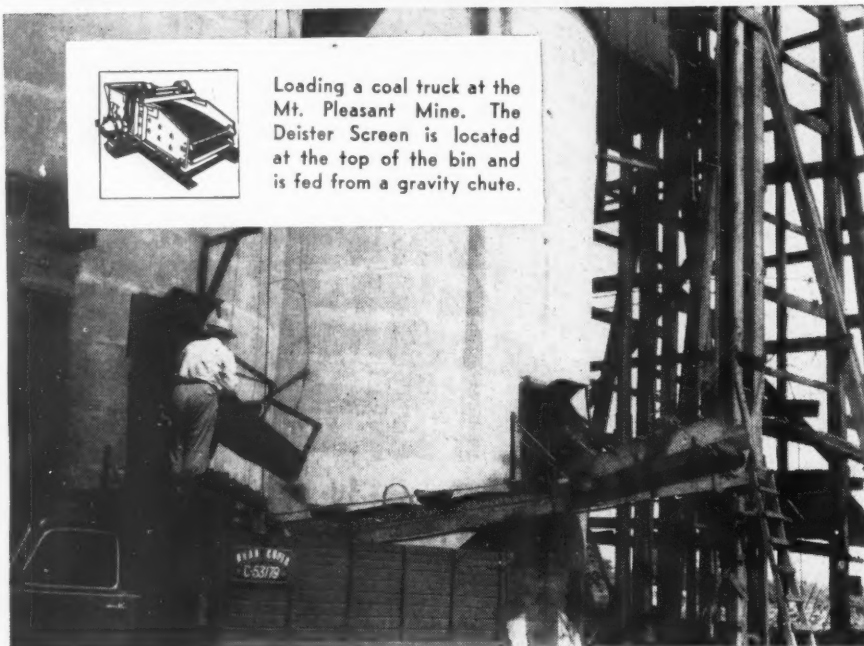


DITCHERS

"A Great Screen ... we're going to buy more"



Loading a coal truck at the Mt. Pleasant Mine. The Deister Screen is located at the top of the bin and is fed from a gravity chute.



That's what Ansyl Hall, president of the Mt. Pleasant Mining Corporation, Terre Haute, Indiana, thinks of Deister Vibrating Screens. "Except for routine belts and screen cloth, our Deister Screen hasn't cost us a dime in seven years of operation."

At the Mt. Pleasant Mine, the Deister 4' x 8' double-deck Vibrating Screen handles all of the $\frac{3}{4}$ " and $\frac{1}{4}$ " coal from two homemade sifters. The present capacity runs about 175 tons in an eight-hour day, with the Screen operating only when the hopper is filled. According to Mr. Hall his Deister Screen could handle 1,000 tons a day if operated continuously on an eight-hour shift.

The rugged design and construction of Deister Vibrating Screens assure minimum maintenance and high capacity throughout long service-life. The proved dependability and more accurate sizing have made Deister Screens tops with operators the world over. Write for Bulletin 27B — "Better Sizing Cheaper."



DEISTER MACHINE CO.
FORT WAYNE 4, INDIANA

tion of its design, construction and use. Operating technic was shown by slides taken in local Old Ben mines by Jack Lyons, safety engineer, Bell & Zoller Coal & Mining Co., Zeigler, Ill.

Later, the meeting hall was connected with Mine No. 15 of the Old Ben Coal Corp. via the regular telephone line to the hall connected to the mine trolley system at the mine. Conversations with the night mine manager and motormen traveling inside the mine were heard by everyone in the room.

Varied Program Planned For Three-Group Meet

The next Joint Fuels Conference of the Fuels Division, A.S.M.E., and the Coal Division, A.I.M.E., will be accompanied by the Central Appalachian Section, A.I.M.E., in a two-day meeting to be held Nov. 3-4 at the Greenbrier Hotel, White Sulphur Springs, W. Va., and is expected to be one of the biggest semi-annual meetings in recent years, according to an recent announcement by the program committee.

In planning the meeting, the committee is taking notice of the changing marketing conditions in the coal industry, with a realization of the necessity of encouraging better sound engineering practices and fuel efficiency, which also must meet the popular demand for smoke abatement. Speakers will be chosen to expose and discourage the encroachment of government bureaus on coal and other industries. The meeting's location convenient to southern West Virginia, Virginia, Kentucky and Tennessee coal fields is expected to draw many prominent operators and engineers.

W. Va. Bureau Seeks Cut In Roof-Fall Accidents

A campaign to reduce accidents from falls of roof and slate was being planned last month by the West Virginia Department of Mines. According to Arch J. Alexander, chief of the department, a meeting of state inspectors was being called, following an "unusually high" accident and fatality rate during August, in which 40 deaths were reported, many of them from falls.

No change in regulations was expected, but the importance of rock dusting and better timbering was to be emphasized to the inspectors and they were to be instructed to inspect the mines more carefully and seek more rigid compliance with present standards, especially on rock dusting and timbering.

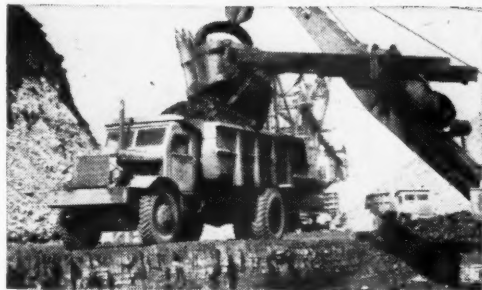
"Some progress" was being made in a similar drive to cut down haulage accidents started early this year, although definite figures were not yet available, Mr. Alexander said.

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for Owners*



Bottom-Dump Euclid Coal Hauler being loaded with 40 tons of coal at an open pit mine of Cent. I Ohio Coal Company.



15-ton Rear-Dump Euclid Coal Hauler being loaded by a 7½ cu. yd. shovel at Georgetown Mine of Hanna Coal Co. in southern Ohio.



Model LD Rear-Dump Euclid dumps 30 tons of heavy overburden on a waste bank in the anthracite field. Owner: Dick Construction Co., Inc., of Hazelton, Pa.

On job after job, Euclid equipment is stepping up production...moving big yardages of material at less cost per ton or yard. Because they are designed and built throughout for the heavy service of off-the-highway hauling, Euclids actually cost less to own than ordinary hauling equipment.

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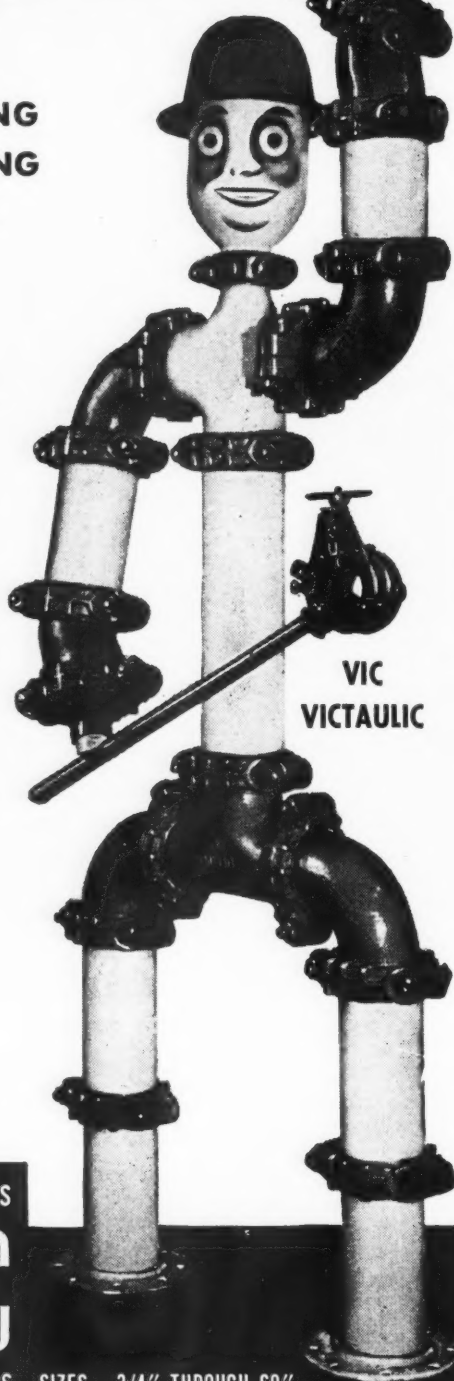
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Virginia Mining Company Seeks NLRB Action

Complaints charging unfair labor practices were filed Sept. 13 by the Peerless Coal Corp., Glamorgan, Va., against the U.M.W.A., District 28, and Local 6228 at Glamorgan. The action, which was filed at the NLRB's regional office at Baltimore, reportedly charged that the union had endeavored to compel the company to force its sublessees to organize union locals, had requested the company to cancel leases of its sublessees who refused to organize such locals and had threatened stoppages at the company's deep mines if it did not force or cause such sublessees to encourage their miners to join the union or recognize it as the bargaining agent.

The Peerless Coal Corp. is reported to have some 5,000 acres of coal lands in the area and to have recently leased considerable acreage to various strip and wagon mine operators, most of whom are not organized. The company's two deep mines have been closed since Aug. 11, when the 300 union miners employed there refused to enter the mines and the complaint asks that these miners be ordered to return to their jobs.

A work stoppage by miners in the Big Laurel, Va., area was reported Sept. 14, reportedly in protest against Peerless Coal's action in seeking an injunction against the Glamorgan local union.

Pennsylvania Companies Fight Local Coal Taxes

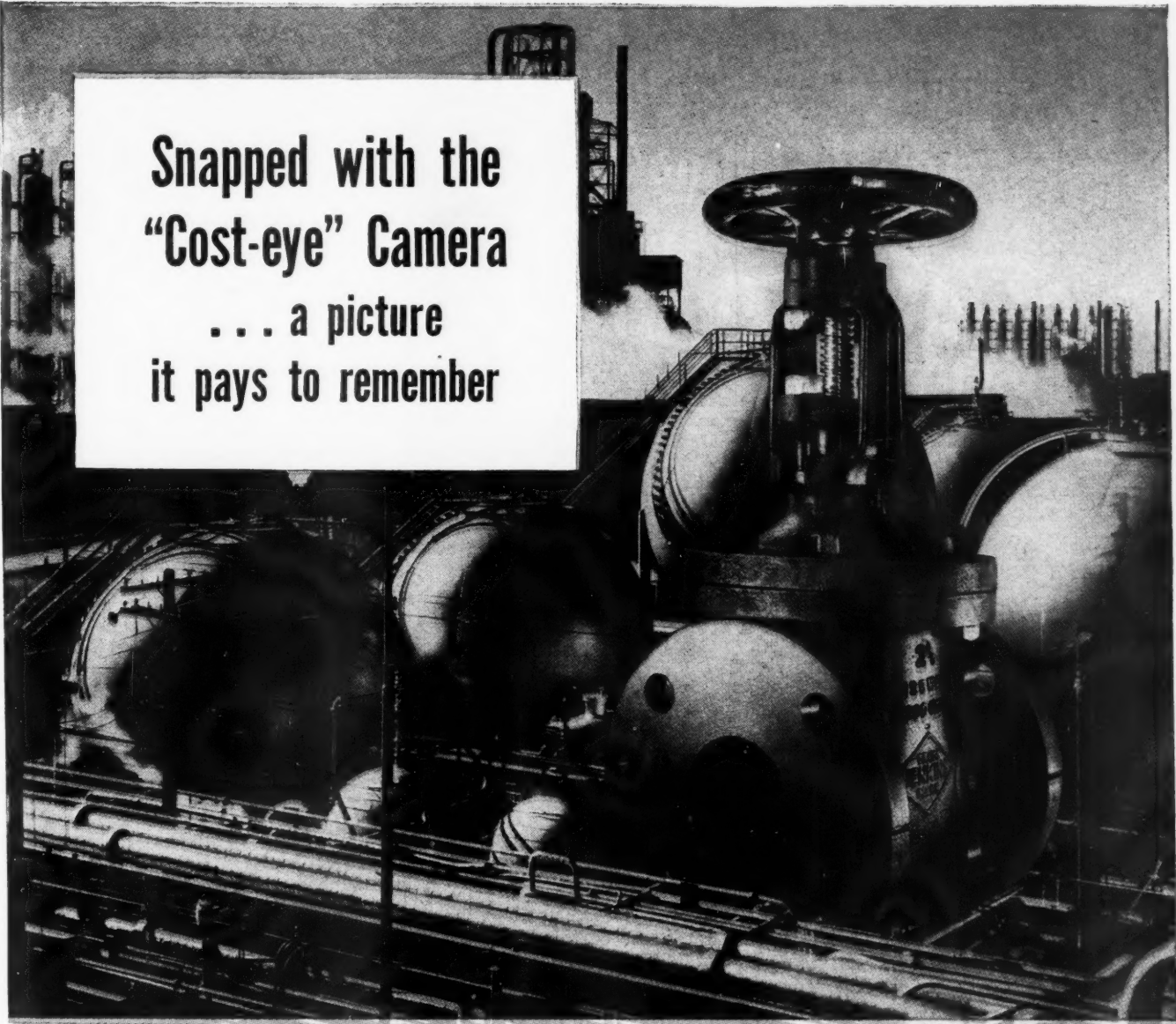
New legal steps to block levying of taxes by Pennsylvania school districts and townships on coal mined within their limits were reported in at least five of the communities last month.

In Luzerne County, the suit brought by the A. E. Dick Construction Co. attacking the Hazle Township tax on stripping machinery (*Coal Age* September, p. 142) was heard before Judge W. A. Valentine. Stipulations were agreed to by counsel for both sides and no further testimony was taken. The Dick company said it hoped to get action before the state supreme court at the fall session opening Oct. 1. Late in August, The Fairmount Land Co. secured a preliminary restraining order in the local court to prevent the Plains Township School Board from collecting a tax of 20c. per ton imposed on all coal mined by stripping.

In a Columbia County court, six coal companies secured a temporary injunction halting collection of a 5c.-a-ton-tax levied by the Conyngham Township School District. Further hearings were scheduled for Oct. 19 at Bloomsburg.

A request to remove an injunction granted Sept. 9 prohibiting the Coal Township School District from collecting 10c. a ton on strip-mined coal was refused in the Northumberland

Snapped with the "Cost-eye" Camera ... a picture it pays to remember



IF A CAMERA could be constructed with an eye to costs, this is the picture you'd get of a synthetic rubber plant. By showing *all valves as one valve* it brings into proper perspective the valve investment in *any* plant, *any* large building where operation involves fluid control. Collectively, valves represent a major expenditure ... yet too often, they are selected with "petty cash" consideration.

IT WILL PAY MANAGEMENT to keep this picture in mind. With wages and material costs the highest ever, valve maintenance costs must be

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EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets.

JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, inspection or maintenance.

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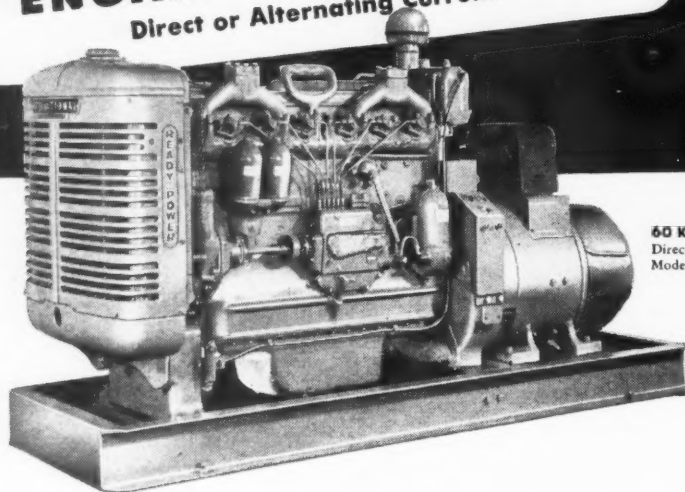
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County court Sept. 15. The court action was brought by the M. A. Hanna Co., Philadelphia & Reading Coal & Iron Co., Alaska Coals, Inc., and North Mines Coal Co.

On Sept. 1, the Russell Mining Co., Old Forge, filed a bill in equity requesting an injunction restraining the Old Forge Borough Council from putting into effect a tax of 10c. per ton on all coal mined in the borough.

Meanwhile, a court test of a tax on mine refuse scheduled to go into effect Sept. 13 in Luzerne Township was reported quite likely. The tax of 7c. a ton affects the Crucible Steel Co., which transports refuse from its mine at Crucible, Greene County, across the Monongahela River, and dumps it on its own property in the edge of Luzerne County.

Rescue Workers Open Kentucky Mine Tomb

Seven of the 20 bodies entombed in the Kentucky Straight Creek Coal Co. mine near Pineville, Ky., since an explosion Dec. 26, 1945, were located Sept. 11 by rescue workers who had been working for some time to open the mine and remove the bodies. While the location of the other 13 bodies was not known, there was a distance of only 1,000 to 1,200 ft. yet to be covered, according to A. D. Sisk, chief, Kentucky Department of Mines and Minerals. Slate falls had hampered the efforts to reach the first bodies discovered $2\frac{1}{2}$ miles in, and with others anticipated three weeks to a month might be required to finish the job, Mr. Sisk said.

According to reports, the work is being financed by a fund made up of contributions by the U.M.W.A., coal operators and other sources. The 1948 Kentucky legislature had appropriated \$100,000 to be used in driving a new entry to recover the bodies, but Assistant Attorney General M. B. Holifield earlier this summer ruled that the project should be a private enterprise and state funds could not be used.

State Bureau to Press Anthracite Smoking Ban

Increased efforts to prevent the carrying of matches and smoking materials into anthracite mines was promised at a special news conference Sept. 15 by Richard Maize, Pennsylvania Secretary of Mines, who said that he had ordered state inspectors to go as far as searching lunches. Fifteen violations of an 1891 law that prohibits taking into a gaseous mine anything that may remotely cause an explosion have been reported in the anthracite region since the first of the year, he stated.

In pointing out the lengths miners



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MORE SHOTS
-MORE TONNAGE**



Less resistant and faster conveying,

3-WAYS FASTER and ALL WAYS BETTER DRILLING with COALMASTER

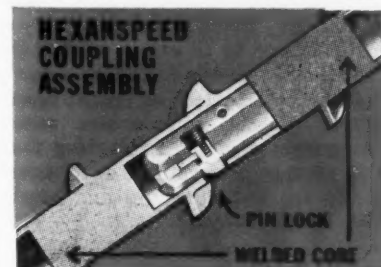
The Spir-L-Weld of Coalmaster augers provides a smoother, fast conveying flight surface with reduced resistance and less strain on the operator or equipment.

Coalmaster Bits are engineered and designed for scientifically correct cutting edges and accurate bevel to achieve fast, true cutting. Secured by Coalmaster patented Z-type wedges, they are rigidly positioned in perfect alignment.

Time lost in auger changes is a thing of the past with quick make-and-break Hexanspeed couplings. Auger changes are a matter of seconds. Note how this high strength, rigid coupling (at left) makes possible the tubular core that gives the advantage of light weight augers for underground drilling.



Rigidly inspected Coalmaster Steel Bits heat treated for high strength, wear, and abrasion resistance.



Auger changing time reduced to a fraction.



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CHOOSE Collyer MINING CABLE

FOR UNINTERRUPTED
POWER AND SAFETY



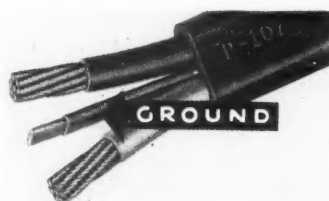
COLLYER Twin Parallel Type G Mining cable is "tops" for the toughest power jobs. Every foot of this tested and approved cable withstands the punishment of mining work and gives enduring, efficient service. Lead-cured neoprene jacket safeguards conductors against acids, alkalis, abrasion — and resists impact or crushing blows. Rubber insulation of high dielectric strength prevents damage from corona; Collyer engineered construction eliminates internal friction and assures easy handling and workability. Check your requirements... then choose Type G Collyer Mining Cable.

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▶ **FLAT** construction streamlines for easier reel loading . . . resists crushing and keeps power flowing under most rigorous conditions.

PROTECTED ground wire means positive grounding for off-track equipment. ▶



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will go to get around the law, Mr. Maize cited the conviction the day before of a miner who carried eight matches and eight cigarettes wrapped in wax paper inserted between two slices of bread into a gaseous mine. The miner was fined \$50 and sentenced to the maximum three months in jail. The assistance of the U.M.W.A. district presidents would be sought, Mr. Maize said, in pleading with the miners to leave smoking materials at home.

Red Jacket Awards Four-Year Scholarships

Two scholarships at West Virginia University, each worth \$600 a year for four years, have been created by the Red Jacket Coal Corp., Red Jacket, W. Va., for its employees and sons of employees. Winners of the first awards recently announced are: Donald L. Hinkle, son of Mrs. Nora Hinkle, Red Jacket; and Robert Lee Miller, son of James V. Miller, Wyoming.

Winners were selected on the basis of a competitive examination conducted at Red Jacket in July by members of the University's School of Mines staff, plus consideration of high-school scholastic records and general all-round achievements. Both young men have enrolled at the University to study mining engineering and will be offered summer employment in the company's mines for the next four years.

Blasting Rules Set for Anthracite Stripping

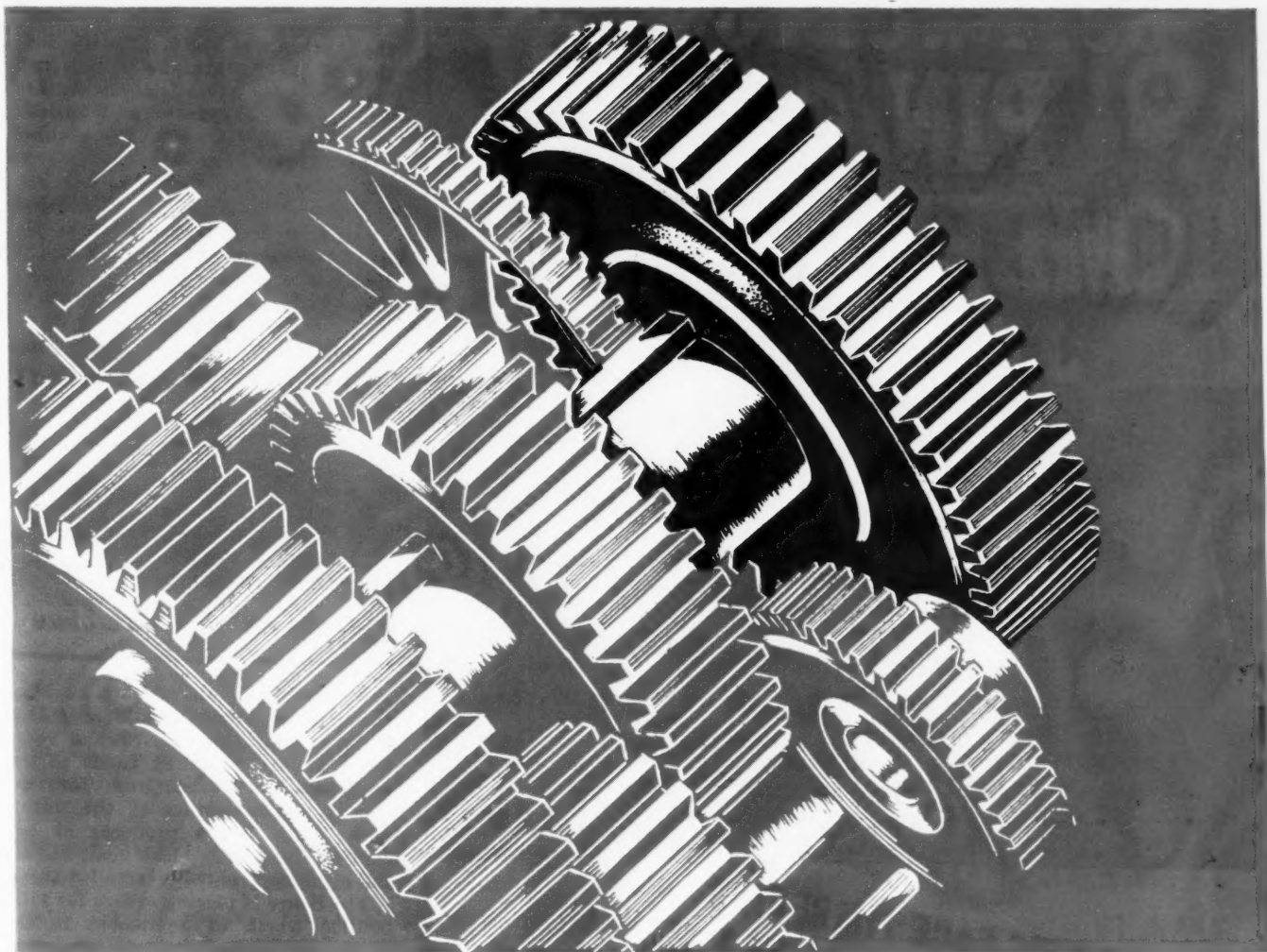
A series of regulations covering blasting at anthracite strip-mine operations, drawn up with the cooperation of coal companies, explosives manufacturers, explosives engineers and the mines department, were announced Sept. 15 by Richard Maize, Pennsylvania Secretary of Mines.

Among the regulations, which followed complaints by homeowners in the region that their homes were being damaged by blasting, was the requirement that ground displacement must not be in excess of 0.03 in. at any house, public building, school, church or commercial or institutional building. Other stipulations cover blasting near a pipeline, blasting that would change the course or channel of a stream and guarding and barricading of highways.

Special Advertising To Push Anthratube

A special advertising campaign on the Anthratube in selected areas of eastern Pennsylvania and southern and northern New Jersey was to be started last month by the Anthracite Institute, following recent increase in production of the units. The campaign was scheduled to

YES! Tycol "Engineered Lubrication" performs better . . . BETTER . . . BETTER



Tycol Engineered Lubrication performs better because:

. . . *Tycol Engineered Lubrication* supplies the scientific answer to every lubricating need in industry—from spindle oils for textile plants to roll neck greases for steel mills.

. . . *Tycol Engineered Lubrication* boosts production by promoting efficient, smoother-running machine operation . . . there's a Tycol oil or grease "engineered" for your specific job.

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Pin timbering—new and efficient method of face timbering—utilizes Duff-Norton Pin Timbering Jacks for supporting cross-bars in working places, as illustrated above. Jacks are set on pins $1\frac{1}{2}$ " in diameter and 18" long, which are placed in rib holes 2 feet from the bottom so that 3" or 4" protrude. Pins serve as rests for the jacks and transfer the load to the rib. Write for descriptive literature which gives complete data on Pin Timbering, and jacks required for installing this face timbering method in your mine.

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THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS



begin with full page advertisements in the Sunday Philadelphia Inquirer Sept. 12 and in the Newark News Sept. 13, continuing on a weekly basis in those publications throughout October. In addition to this advertising, a public-relations campaign featuring demonstrations, radio interviews and news releases, was to be devoted to the Anthratube story. Special mention of the Anthratube in the institute's regular advertising in Anthracite-region newspapers and business papers during the period was planned.

Production of the Anthratube by the Axeman-Anderson Co., has been recently doubled, and the Bethlehem Foundry & Machine Co. plans to produce 400 of its new model a month, the institute reported.

Foreign Developments



Australia—In an attempt to blast the coal production bottleneck, Australia's Joint Coal Board has voted itself almost unlimited funds to import machinery required for the speedy mechanization of the mines. New South Wales produces 85 per cent of Australia's black coal, and all the machinery is to be installed there.

The Board is placing orders for \$10,000,000 worth of equipment in the U. S. and Britain and is expecting deliveries to get underway early in 1949. Orders include mobile loaders, coal-cutting machines, shuttle cars, elevating conveyors, mine locomotives and cars, belt conveyors, trailing cables, electric motors and equipment.

Because of its strong position as a single buying agent, the Board expects to get special concessions on these purchases. The equipment will be sold at cost to mine owners. The mines were to report by Sept. 30 the equipment needed.

The first 7,000 of 120,000 tons of British coal bought for the state of Victoria was to leave England in September. While the coal costs users about three times as much as coal from New South Wales, production there has dropped so far behind demand that the state government has had to arrange for emergency imports of British coal. Normally, Australia has an exportable surplus of 1,000,000 tons a year while imports are confined to a few thousand tons of anthracite for carbide making.

The Australian Coal Board has rejected a claim by the Miners' Federation for retroactive "long service"

National Electric

Indestructo

MINING MACHINE CABLES

The New NE Indestructo Parallel Duplex Cable
with Ground Conductor



WHEN A POSITIVE
GROUND IS ESSENTIAL

"INDESTRUCTO" Mining Machine Cables are SAFE Cables. Their fire-resistive qualities far surpass the flame standards set by Pennsylvania Act No. 206 (NE Approval No. P-106) and Federal Mine Safety Code.

Here's a Parallel duplex cable with ground wire you can depend on for longest life and maximum safety. It is especially designed and built to withstand the hard usage encountered with rubber-tired mining machines.

The tough NEOPRENE jacket is bonded to the conductors by a reinforcing seine-twine braid resulting in a cable that is highly resistant to the crushing effects of rubber-tired equipment.

There is a type of "INDESTRUCTO" Cable or Cord for every mechanized unit used in mines. See "MINING CATALOGS" for complete listing, or let us send you our illustrated catalog.

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For Your Toughest Conveying Jobs

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"SSS" Conveyor Belting is custom-built to specifications based on particular performance requirements. Write us the details and we will quote on a belt *engineered to your job*. We can deliver promptly . . . and you can count on the delivery date promised.



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leaves at full pay, for periods ranging from three up to 18 months. The immediate cost of the plan to the coal industry would be \$23,000,000, or about \$1.60 per ton of coal. The Coal Board is trying to compromise on an alternative plan which would avoid an immediate mass holiday for hard-to-replace mine workers.

Long service leave provisions now operate in the state-owned coal mines and open-cuts in Victoria, where workers are entitled to six months' paid leave after 20 years' continuous service.

Although Australia's Labor Government is playing down nationalization of private enterprise at the moment, socialization continues through the back door. The Local Government Act of New South Wales has been amended to vest additional trading powers in local government bodies. These include supply of building materials, operation of coal mines and supply and distribution of coal.

In New Zealand, a bill providing for the nationalization of all privately owned coal measures has been introduced in the House of Representatives. The bill does not affect private operation of coal mines. Private owners of coal will receive compensation equivalent to 15 years' royalties and rent.

The Australian Iron & Steel Ltd. has opened a training school for youths who desire to enter the coal mining industry, which is expected to solve some of the labor problems associated with the coal shortages now worrying all branches of industry. Youths of 16 and over will be trained in a six weeks' course and will be paid while undergoing instruction that will cover elementary rudiments of ventilation, safe working, and geology. They will be given practical experience in timbering, track work operation of loaders, cutters and locomotives, etc. Fresh trainees will be taken in every six weeks and all those trained will be given jobs in the company's mines.

Canada—Issuance of an official warning that Canadians must go easy on coal and fuel oil supplies this winter was to be expected shortly, according to government sources. Although Canada's fuel picture looked brighter than a year ago, storage difficulties still persisted. The Dominion, it was said, still was unable to transport sufficient fuel oil and coal from the United States season to cover the entire winter requirements in the short navigation season.

Meanwhile, it was reported that Canada would receive U. S. dollars for 400,000 tons of coal being shipped to Japan under a contract to be completed in October. Deliveries via both Canadian and U. S. ships at a rate of 75,000 tons a month started early this summer. The shipments are coking coal, prohibited by Canadian law, because of its dust, for use by railways. It is being secured from mines in British Columbia and north-

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work on the part of the Heyl & Patterson design, electrical, fabrication, machine shop and erection departments.

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What makes them **TICK?**

H&P field specialists have become acquainted through the years with the manner in which every other part of the team operates. Because of this knowledge they can do a better erection job for you.

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55 WATER STREET • PITTSBURGH 22, PA.



Wear-resisting Dipper Teeth for Only \$6.92 each

That's how P&H Hartop hard-surfacing electrodes and P&H Harnimang A help you keep your digging costs down

Fix your worn dipper teeth this easy, low-cost way: Take a piece of manganese bar stock (they roll it in just the right shape) and weld it to the tooth stub with P&H Harnimang A. We suggest Harnimang A, because this nickel manganese electrode gives you high tensile strength and the same kind of resistance to impact and abrasion found in standard manganese steels. It work-hardens to 459 Brinell.

This operation alone gives you a dipper tooth as good as new. For a *better-than-new* tooth, all you have to do is hard-surface the tooth with Hartop Red. The hard protective coating you get from Hartop Red — it has a Rockwell C hardness of 55 — resists impact and abrasion. By the time this coating has worn away, the manganese point has work-hardened and your tooth gives you many extra cubic yards of digging before it needs rebuilding.

This is only one way P&H Hartop hard-surfacing electrodes save money for you. There are 4 types so that you can maintain and repair most anything. Use:

- HARTOP BROWN — Rockwell C40 — for angular shock and abrasion.
- HARTOP GREEN — Rockwell C50 — for general all-purpose hard-surfacing.
- HARTOP RED — Rockwell C55 — to resist severe impact and extreme abrasion.
- HARTOP YELLOW — Rockwell C63 — to resist flat impact and abrasion.



Get a few packages of these money-saving electrodes from your P&H distributor. If he can't supply you, write us for prompt service.



ern Alberta and is understood to be surplus above normal Canadian requirements.

Newfoundland's entry into confederation with Canada is expected to intensify the search for coal on the island and its dependency, Labrador. Though the island was discovered more than 450 years ago, its mineral resources and those of Labrador have never been completely surveyed. The Canadian Government, in outlining what it would do when Newfoundland became a part of Canada, has indicated that it would carry out a thorough search for minerals. So far coal has been discovered on the east coast of the island, but the deposits are held to be only the outcroppings of the Nova Scotia coal fields.

The recent annual convention of the United Mine Workers, District 26, adopted its policy committee's report seeking a daily wage increase of \$2.56 for 13,000 Maritime miners in Canada. The boost will be pressed when the present contract expires Jan. 31, 1949. Current basic rate is \$7.46 daily.

After the last convention two years ago, Canadian miners won a dollar a day increase following a prolonged strike. Later they obtained a 40c. a day bonus for increased production and last March their new contract contained another 40c. boost.

In Nova Scotia, the union recently passed a resolution demanding that if the Dominion Steel & Coal Corp., Nova Scotia's largest steel and coal operator, would not expand and develop its industry, the Canadian Government take over the entire operations of the company in Nova Scotia and run them as a public utility.

Moscow—On Sunday, Aug. 29th, Miners' Day was observed for the first time in the Soviet Union by the country's coal miners, who in an open letter to Premier Stalin reported that the nation's coal output had reached a level 14.8 percent higher than this time last year when prewar output levels were surpassed. Seeking to reach a gross output level of 250 million tons a year by the end of next year, the miners pledged to fulfill a boosted output program, open 105 new mines and open-cut workings and produce 2,800,000 tons in excess of plan by the end of this year.

On Miners' Day the Soviet press reviewed progress in the country's coal industry which has been rapidly recovering from war damage. The major coal field in the Donbas is now reported to be producing at upwards of 80 percent of prewar output. With the production of the Moscow coal basin, the Donbas in 1940 accounted for upwards of 65 percent of the gross Soviet production.

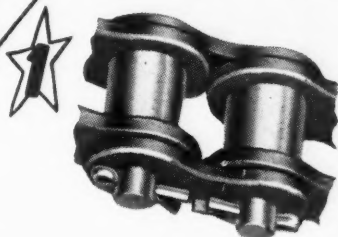
Output at the war-damaged Moscow coal basin, now completely restored and reequipped, is given as 2.3 times greater than in prewar.

The new coal fields in the eastern regions of the country, the Urals, Siberia and Central Asia, that suffered

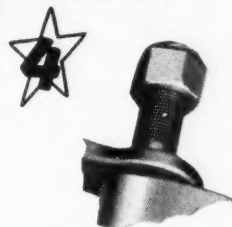
4

STAR FEATURES
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MINING CHAIN

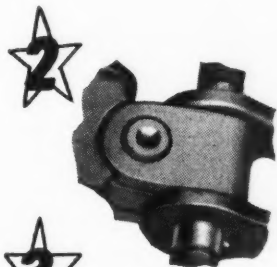
THAT KEEP TONNAGE UP . . .
MAINTENANCE DOWN



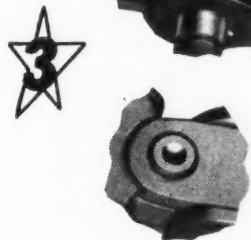
Link Parts — plates, pins, bushings and rolls — are precision made from heat-treated alloy steel stock assuring long operating life with minimum maintenance.



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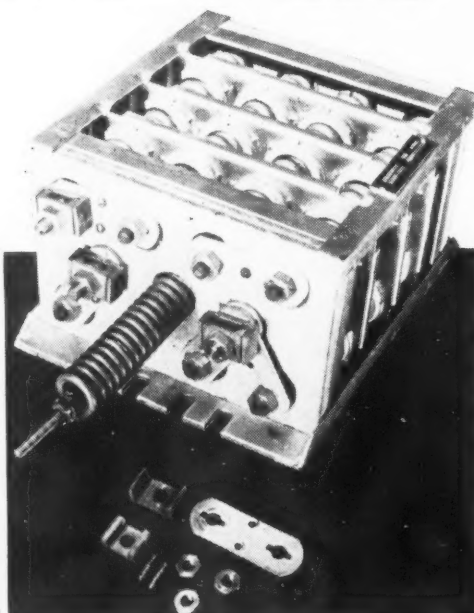
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LOCOMOTIVE RESISTORS

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GUYAN MACHINERY CO. LOGAN W. VA.

no war damage, are reported to be producing 60 percent above prewar levels. Much of this output comes from the new mines sunk in eastern coal fields during the war, when a total of 30,000,000 tons annual capacity was added to eastern coal production. These new mines added to the mines sunk under the prewar industrialization program made it possible for the Soviet Union in the years 1942-1944 to maintain an annual average output of 73,000,000 tons of coal at a time when little or nothing was being produced in the enemy-occupied areas, it is reported. Donbas restoration began immediately after liberation in 1943, and by the end of the war the Donbas mines had reached a daily output of 96,000 tons.

Coal and its production has been an object of major Government concern. The eastern coal fields were developed under the Stalin prewar plans of industrialization. Under these five-year plans more than 40 new coal mining centers were established, and many new towns appeared on the map of the Soviet East. Meanwhile, gross Soviet coal output went up to 166,000,000 tons in 1940, more than five times greater than the output of Tsarist Russia in 1913 when the country's major coal basin, the Donbas, accounted for most of the output.

The Soviet Government also is rebuilding the Grumant City and Barentsburg coal mines on the island of Spitzbergen where Soviet-owned coal properties were demolished by the Germans during the war, according to a recent report in the Soviet Navy newspaper *Red Fleet*.

The Spitzbergen coal reserves are estimated in billions of tons, and during ten years prior to 1941 the Soviet-owned mines on Spitzbergen produced upwards of two million tons of coal, most of which went to fuel Soviet vessels navigating arctic waters.

Association Activities

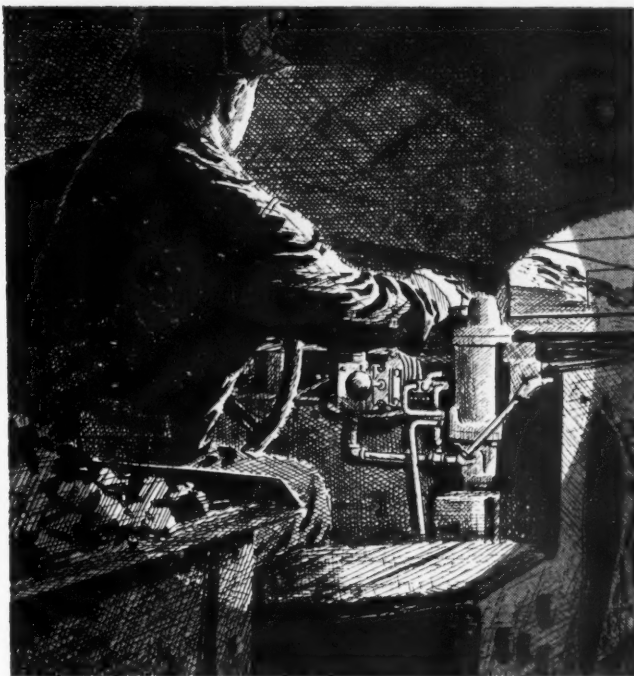
Big Sandy-Elkhorn Coal Mining Institute, Pikeville, Ky., has named J. H. Mosgrove, Middlesboro, Ky., secretary-treasurer, to succeed A. D. Sisk, recently appointed chief of the state Department of Mines and Minerals.

Hazard Coal Operators' Association, Hazard, Ky., has named L. A. Harper executive secretary. Mr. Harper, who is a member of a Harlan, Ky., law firm, was previously associated with the Bituminous Casualty Co.

A.I.M.E., New York, has announced the resignation of Dr. A. B. Parsons, secretary of the Institute for the past 18 years. Dr. Parsons' resignation is effective next February, but in the meantime he is to be on a leave of

Putting WESTINGHOUSE BRAKES on your locomotives

Puts the brakes on
maintenance too



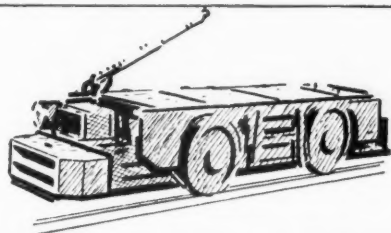
One of the most important steps in any high-speed haulage program is the installation of *dependable power brakes* . . . and it's an important step in maintenance-control programs, too.

Westinghouse brakes mean greater safety in controlling trips, higher allowable speeds, and quicker, more-accurate stops. And in addition, they bring substantial savings in locomotive maintenance that soon pay for the brake investment.

One user reported that the use of power brakes had increased brake shoe life from one week to three months and decreased wheel turning 50%. Less sand was required, and better rail contact cut power loss and overheating.

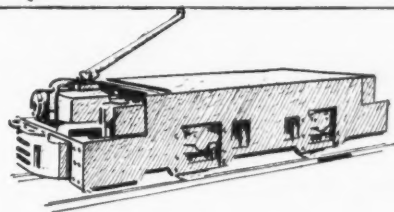
Motor bucking to check speed or stop was entirely eliminated, with a consequent saving in repairs and replacements of split motor pinions, broken axles and armature shafts, and loosened coils.

For *Light* Locomotives



For smaller locomotives where space is limited, Westinghouse Hydraulic Brake Equipment provides a complete, practical answer to power brake needs. Rugged, husky parts are small and compact, can be easily fitted into available space. Installation can be handled when unit is in shop for overhaul.

For *Heavy* Locomotives



On larger, heavier locomotives used for long hauls with heavy trips, where space is available for compressor and tank, Westinghouse Air Brake Equipment is recommended. It reflects the engineering and workmanship that has safeguarded railroad travel for over three-quarters of a century.



Ask for information on power brakes—
air or hydraulic—for your locomotives.

WESTINGHOUSE AIR BRAKE COMPANY

INDUSTRIAL DIVISION

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BEARINGS

Cost less because they wear longer—wear longer because of a specific formula for every requirement.

AXLE BEARINGS, JOURNAL LINERS, BUSHINGS, AND WEARING PARTS. FOR GENERAL ELECTRIC, SULLIVAN, WESTINGHOUSE, GOODMAN, OLDROYD, JOY, JEFFREY EQUIPMENT.

PROMET BABBITT

Lead or tin base. 3 grades.

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Round, hexagon, square. Rough cast, semi-finished. Cored stock all sizes (by 1/8" steps) from 1/2" minimum core to 12" O.D. and 12" lengths. 6 grades of hardness.

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Prompt deliveries can usually be made from stocks maintained at

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absence and after Nov. 1 he will make his home in Oakland, Calif. E. H. Robie will be acting secretary of the Institute for the balance of this year.

Preparation Facilities

Cabin Creek Coal Co., Scotch Valley, Pa.—Contract closed with Wilmot Engineering Co. for four 2½-ft.-diameter Hydrotators for preparing pea, buck No. 1, rice and barley; total feed capacity, 71 t.p.h.

Philadelphia & Reading Coal & Iron Co., Brookside colliery—Contract closed with Wilmot Engineering Co. for one 16-ft.-diameter Hydrotator for preparing buck No. 5; feed capacity, 65 t.p.h.

Franklin Hydrotated Coal Co., Ravine, Pa.—Contract closed with Wilmot Engineering Co. for one 2½-ft.-diameter Hydrotator for preparing rice; feed capacity, 18 t.p.h.

Rosini Brothers, Shamokin, Pa.—Contract closed with Wilmot Engineering Co. for one 2½-ft.-diameter Hydrotator for preparing pea; feed capacity, 20 t.p.h.

Glen Alden Coal Co., Woodward colliery, Edwardsville, Pa.—By agreement with Menzies Separator Co., to be manufactured by Glen Alden Coal Co.: one 8-ft. Menzies cone to clean stove coal, feed capacity, 70 t.p.h.; one 8-ft. Menzies cone, to clean nut coal, feed capacity, 70 t.p.h.; one 8-ft. Menzies cone to clean pea coal, feed capacity, 70 t.p.h.

Markson Coal Co., Goodspring, Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean No. 5 buckwheat; feed capacity, 15 t.p.h.

Northwest Coal Co., Raymond colliery—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean barley; feed capacity, 22 t.p.h.

F. & L. Coal Co., Shamokin, Pa.—Contract closed with Menzies Separator Co. for one 3-ft. Menzies cone to clean pea; feed capacity, 12 t.p.h.

Leon Kocher Coal Co., Valley View, Pa.—Contract closed with Menzies Separator Co. for one 8-ft. Menzies cone to clean stove, nut and pea; feed capacity, 70 t.p.h.

G. & M. Coal Co., Rocky Glen, Pa.—Contract closed with Menzies Separator Co. for one 2-ft. Menzies cone to clean No. 4 buckwheat, feed capacity, 7 t.p.h.; and one 2-ft. Menzies cone to clean No. 5 buckwheat, feed capacity, 7 t.p.h.

D. & Z. Coal Co., Shamokin, Pa.—Contract closed with Menzies Separator Co. for one 2-ft. Menzies cone to

for instance **STRIP MINING**

Know Positively

DEPTH of
overburden

THICKNESS
and quality
of
COAL SEAM



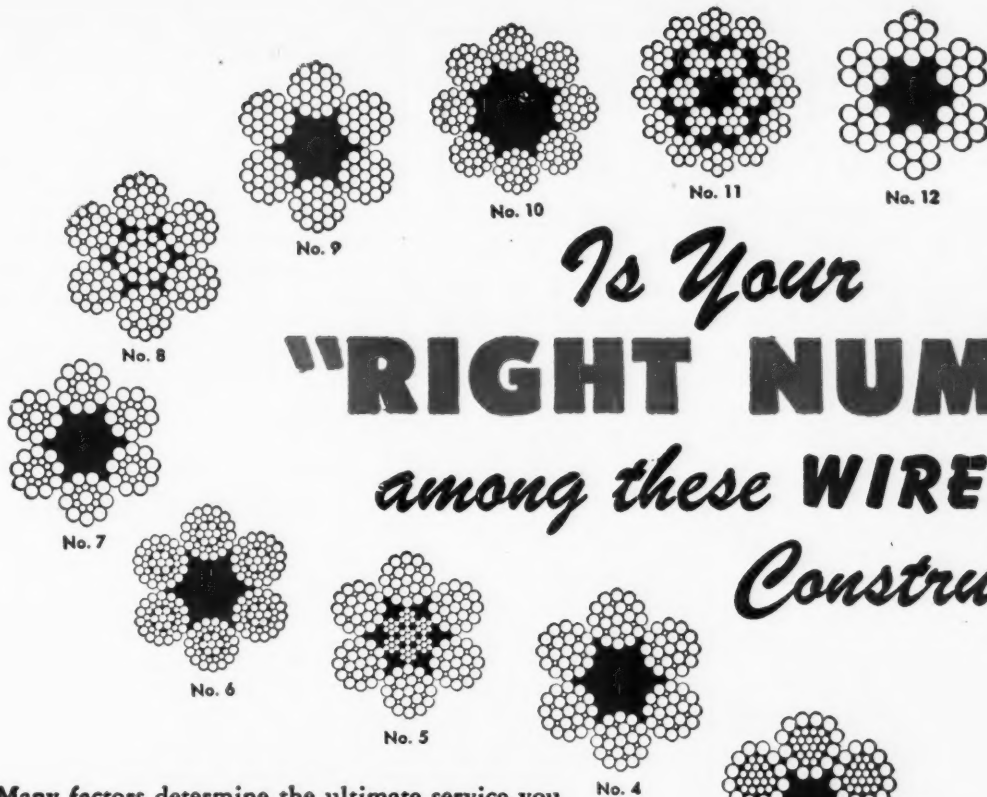
for least cost, labor and time

Light weight, simple operation, Acker Drills furnish complete subsurface information, accurate cores, from 300 ft. maximum depths. No feed screws or feed gears.. Sturdy. Few parts... ideal for work in isolated locations. Easy to move over rough terrain; choice of mountings—truck, trailer or drag. Operate diamond, alloy or steel shot bits. Send for fully descriptive circular.

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SCRANTON 3, PA.

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CORE DRILLS



Is Your
"RIGHT NUMBER"
among these WIRE ROPE
Constructions?

Many factors determine the ultimate service you may expect from a Wire Rope. Among these are size, grade, construction and quality. But equally important is selecting the correct combination of these and other vital factors. Unless a rope fits the particular job to be done, the best results will not be had.

As "HERCULES" (Red Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions—Preformed and Non-Preformed—it offers the 'right number' for *any* heavy duty job.

And our Engineering Department is always ready to help you select the rope that will give you the most service for each dollar of its cost. Call on us anytime.

- No. 1—Style B Flattened Strand—Hemp Center
- No. 2—6 x 41 Round Strand—Metallic Core
- No. 3—Style G Flattened Strand—Hemp Center
- No. 4—6 x 19 Filler Wire Round Strand—Hemp Center
- No. 5—6 x 19 Filler Wire Round Strand—Wire Rope Center
- No. 6—6 x 37 Round Strand—Hemp Center
- No. 7—6 x 19 Seale Round Strand—Hemp Center
- No. 8—6 x 19 Round Strand—Metallic Core
- No. 9—6 x 19 Warrington Round Strand—Hemp Center
- No. 10—8 x 19 Filler Wire Round Strand—Hemp Center
- No. 11—18 x 7 Non-Rotating
- No. 12—6 x 7 Round Strand Haulage Rope—Hemp Center.

All of these constructions are available either Preformed or Non-Preformed.

Use
PREFORMED
 for
Easier Handling
 and
Smoother Spooling



Use
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 for
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Greater Economy

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.

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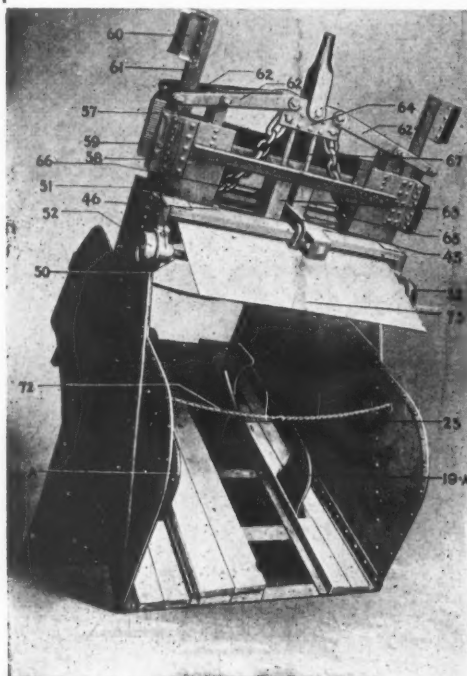
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Simplicity—Ruggedness—
Safety and Low Maintenance
have made our Designs the Answer for Efficient Mining.

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We have nearly 50 years' experience gained by direct contact with top ranking mining companies. Let us solve your material and man handling problems.

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by the end of the week, Bill.
Who's quick on delivery?"



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Those people will have them
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When you need rail bonds in a hurry, think of MESCOWELD first. We carry ample stocks and can make delivery immediately. Furthermore, you can depend upon MESCOWELD Rail Bonds for maximum conductivity and long life . . . thanks to our patented Flashwelding process for attaching bond to cable. 18 standard types available. Write, wire, or phone for immediate quotation on your requirements.



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All-Purpose Bond

MOSEBACH ELECTRIC & SUPPLY COMPANY
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clean buckwheat; feed capacity, 10 t.p.h.

New River Co., Cranberry mine, Cranberry, W. Va.—Contract closed by the Jeffrey Mfg. Co. with the Kanawha Mfg. Co., Charleston, W. Va., for a Baum jig to handle 8x½-in. coal for this operation; capacity, 175 t.p.h.

Shaw-Tutwiler, Inc., Piper, Ala.—Contract closed with Deister Concentrator Co. for two SuperDuty Diagonal-Deck coal-washing tables to clean ⅝x0-in. coal.

Coal Publications

Emergency Escapeways From Coal Mines, by R. T. Artz and O. V. Simpson. U. S. Bureau of Mines, I.C. 7478. 11 pp. plus 13 pp. of illustrations and mine maps. 8½x11; paper; mimeo. Free. Several recent mine fires are briefly described, along with various methods and equipment used for escape of workers following a mine explosion or fire. Use of large-diameter boreholes is discussed at length.

Design and Operation of Electrical Control Mechanisms in Underground Pumping Plants, by Albert C. Durham. U. S. Bureau of Mines, I. C. 7476. 21 pp. plus 7 pp. of illustrations and diagrams. 8½x11; paper; mimeo. Free. A description of the design and operation of two modern automatic pumping plants in the anthracite field, one an underground submerged-type and the other an underground open-type plant.

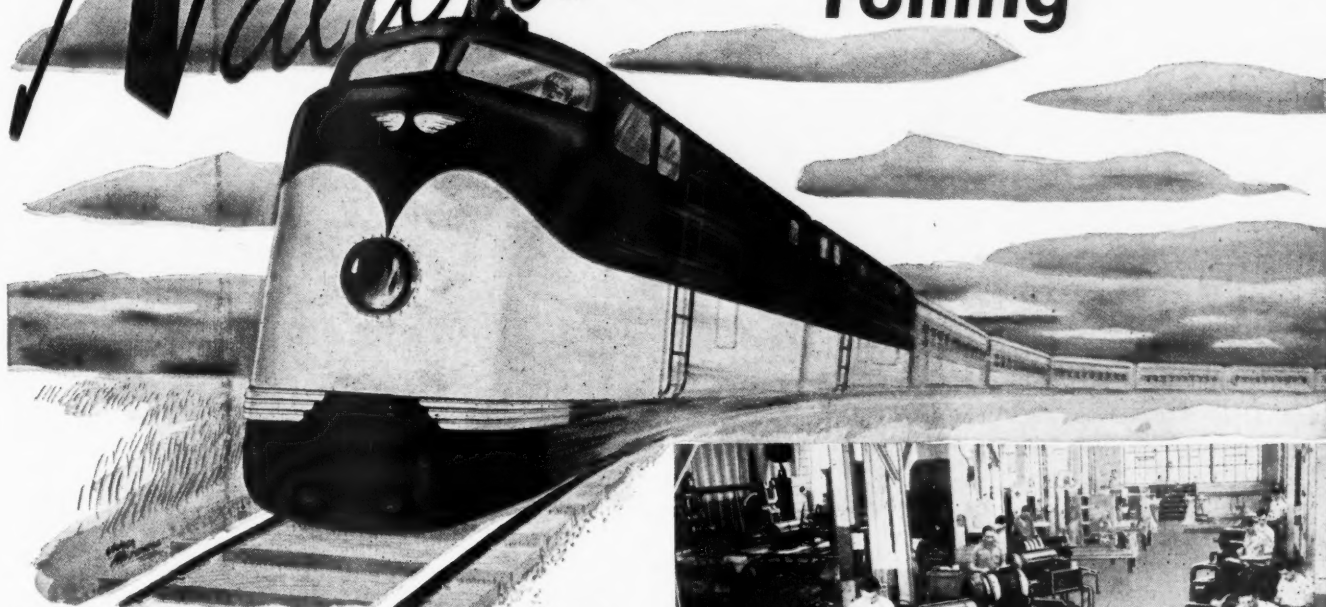
Hazards of Entering Old Mine Workings, by Allen D. Look, Leonard A. Van Fleet and Stanley M. Walker. U. S. Bureau of Mines, I.C. 7479. 18 pp. 8½x11; paper; mimeo. Free. A description of some of the accidents occurring in this connection, means by which they might have been prevented, and preventive steps taken by the Bureau, states and mine operators.

Self-Analysis Quiz for Supervisors and Executives, by Rexford Hersey. American Management Assn., 330 West 42nd St., New York 18, N. Y. 24 pp. 5½x8½-in.; paper 25c.; quantity prices available on inquiry. Eighty-seven questions, with answers, designed to help supervisors and executives review their personnel and management functions and discover their possible weak points.

What's Your Management I. Q.?, compiled by Ellis H. Woolley. American Management Assn., 330 West 42nd St., New York 18, N. Y. 12 pp. 5½x8½-in.; paper. 20c.; quantity prices available on inquiry. One hundred questions, with answers, dealing with the responsibilities of the supervisor as manager, teacher and leader. Designed for operating managers, supervisors and foremen.

National

keeps them rolling



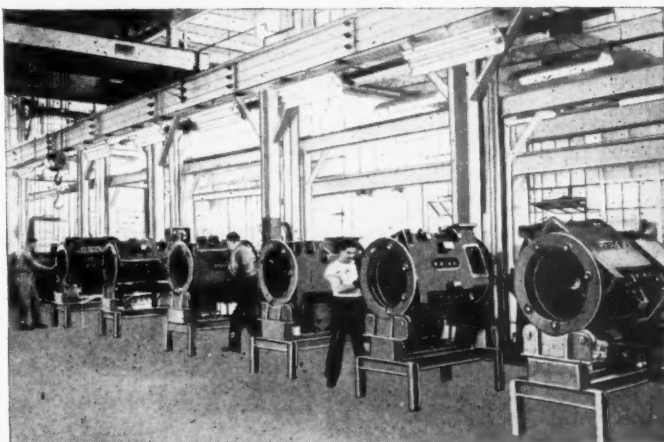
Many of America's leading railways come to National for mileage overhauls and complete rebuilding and rewinding service on their diesel-electric and electric locomotive motors and generators.

That's why they are leaders. They can't risk sudden failures on the road. They can't afford premature failure. They must have minimum cost per ton mile.

And that's a prescription which fits the leaders in any industry. If you could put your finger on all the losses which pile up in your plant when a piece of rotating electrical equipment fails in the midst of production you would do almost anything to avoid it. If you figure the savings possible by spacing overhaul periods 25% farther apart you'll be amazed.

We are not miracle workers, but we keep 'em rolling. We know, by intimate experience, the factors which affect coil life. We can often devise special means to overcome excessive trouble. Better ventilation; changes in wire sizes; different insulation; care in application.

Standard National coils (they're really super-standard) are quickly available for any rotating electrical machine. National pioneered the manufacture and use of Mica-Glas (registered trade-mark) electric insulation, available for application in your shop as listed in our Insulation Catalog. National rebuilding and redesigning (to overcome special weaknesses or to change electrical characteristics) are as near as your near-by National Field Engineer. If you don't know him, let us know. He's there to help you.



Two steps in the rehabilitation of traction motors in our plant

NATIONAL ELECTRIC COIL COMPANY

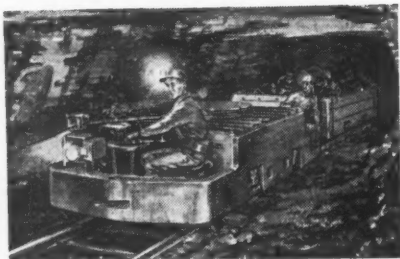
COLUMBUS 16,

OHIO, U. S. A.

ELECTRICAL ENGINEERS: MAKERS OF
ELECTRICAL COILS AND INSULATION—



REDESIGNING AND REPAIRING OF
ROTATING ELECTRICAL MACHINES



Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

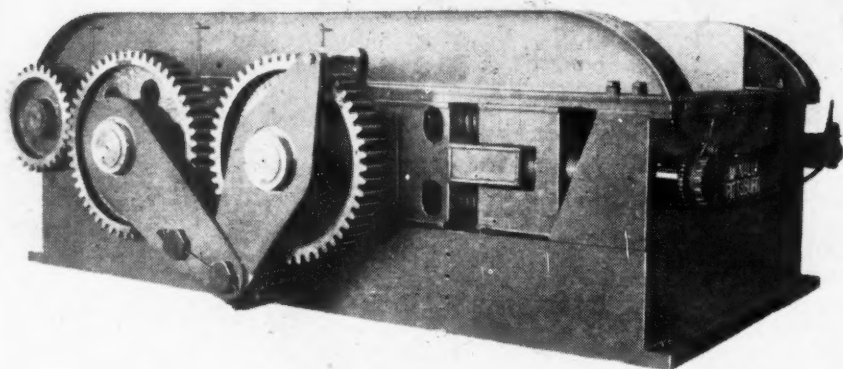
Double-Roll Breaker

A new Gearmatic-drive heavy-duty double-roll breaker has been announced by McNally-Pittsburg Mfg. Co., Pittsburg, Kan. Capacity range is 750 to 1,400 t.p.h., depending on product size, which ranges from 6 to 14 in. The frame is reinforced welded steel, it is reported, and crushing-roll teeth are of flat-face design introduced by the company on its previous line of heavy-duty breakers. Accurate sizing, easy adjustability and high mechanical efficiency are features cited by the manufacturer. The full-floating Gearmatic-drive principle follows the design of its Gearmatic stoker-coal crusher introduced in 1946.

Construction features include gears and pinions of steel with cut spur teeth. Pinions are held in a self-adjusting linkage, which follows the movable crushing-roll gear as it is re-positioned for different size coal. Roll adjustment can be made while the crusher is running. The drive train is housed in an oil-tight case and is continuously lubricated in an oil bath. The breaker shown in the accompanying illustration is a right-hand unit, but left-hand units are available.

Conveyor Belting

A new high-tension fabric conveyor belt called Raynile, for jobs where belt tensions run as high as 1,000 lb. per inch of width—almost double tensions of 48-oz. cotton fabric—has been announced by the Hewitt Rubber



Division, Hewitt-Robins, Inc., Buffalo.

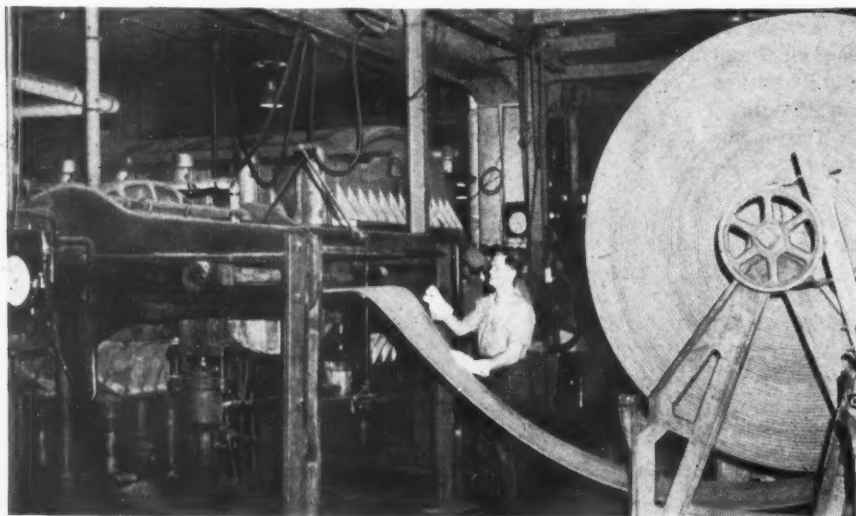
According to the manufacturer, the strength-material consists of a combination of rayon and nylon, offering greater strength than the standard types of cotton woven fabrics or cotton cord belts. Other features of the new belt cited include excellent transverse flexibility, assured by the nylon transverse threads; minimum stretch in actual operation; and easy field splicing because of fabric construction. Reinforcement of Raynile fabric belts is accomplished by plies of rayon and nylon fabric suitably bonded to each other, it is said. The top cover is securely bonded to the carcass by shock-absorbing and distributing cord breaker.

Diesel Engine

A new Cummins HR-600 diesel engine, based on its Model H, yet

developing 10 percent more horsepower, has been announced by Cummins Engine Company, Inc., Columbus, Ind. The new unit develops 165 hp. (maximum) at 1,800 r.p.m., with a 5½-in. bore and 6-in. stroke and a piston displacement of 743 cu. in. Like all Cummins diesels, it is said, the HR-600 is four-stroke cycle and has the exclusive Cummins fuel system.

The HR-600 is available in an automotive model, HRB-600; three industrial models, HRBI-600, HRI-600, and HRP-600, and a marine model, HRM-600. Field conversion to HR-600 from H-600 can be made by Cummins dealers. Steps involved, according to the company, include boring the present block and installing HR-600 pistons and liners and the optional installation of the new increased-flow lubricating system and continuous groove bearings.



CONVEYOR-BELT FASTENERS—

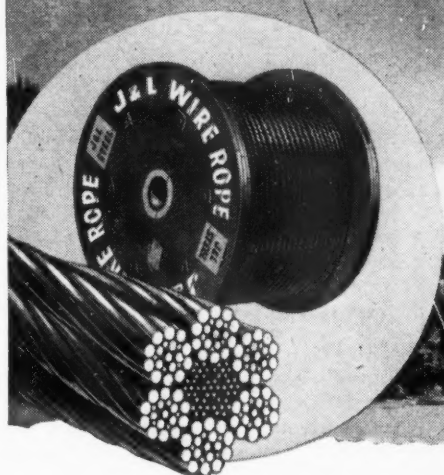
New line of "Plategrip" fasteners and repair plates for heavy duty conveyor belts, announced by Armstrong-Bray & Co., 5364 Northwest Highway, Chicago 30, reportedly can be applied anywhere to pull belt ends together in a smooth flexible tight joint. Of heavy-gage steel and designed for any safe belt load, the units are individually spaced to permit troughing and provide a smooth flush joint. The plates are available for belts ¼ to 1½ in. thick.

"CANNED TUBING" — MineVent flexible vinyl-plastic-coated ventilation tubing made by the American Brattice Cloth Corp., Warsaw, Ind., is now being packed and shipped in Stapak fiber drums that are said to provide protection in shipping, easier

PENBROOK GETS TWICE THE SERVICE FROM J&L *Precisionbilt* WIRE ROPE

J&L STEEL

.... average life jumps from
382 hours to 805 hours,
removing 100% blasted rock!



The J&L Precisionbilt wire rope used for the dragline on this machine: 13 1/4" diameter, 6x19 Type "U", Lang Lay with independent wire rope center.

RECORDS kept by Penbrook Contracting Company over a period of 20 months on an anthracite strip-mining job near Ashland, Pa., show that J&L Precisionbilt wire rope has given more than *twice* the service life of two major competing brands.

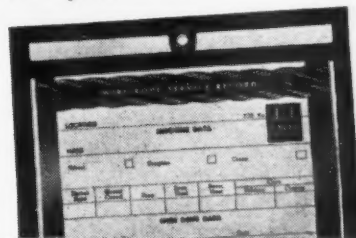
Average life of 9 brand "A" wire ropes:	397.6 hrs.
Life of 1 brand "B" wire rope:	240 hrs.
Average life of all 10 wire ropes:	381.8 hrs.
Average life of 6 J&L Precisionbilt wire ropes:	805 hrs.

As a result of this performance, Penbrook now uses a variety of J&L ropes on its 21 draglines and shovels engaged in two hard coal stripping operations in Schuylkill County, Pa., and six soft coal jobs in Clearfield County, Pa.

This is a typical example of a quality product, correctly applied and properly handled—a combination without which this advertisement could not have been written.

There is a J&L Precisionbilt wire rope for every purpose. Why not

make your own comparison. We'll gladly send you wire rope service-record cards and a transparent holder *free*.



Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me a supply of wire rope service-record cards and transparent holder.

NAME _____

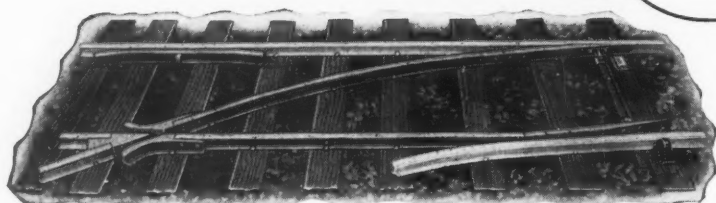
COMPANY _____

ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

WEIR KILBY → FROGS... SWITCHES and TRACKWORK

STAND UP
under
SEVERE
CONDITIONS



Titan Frog, Long Arm Turnout

The Titan Frog is furnished in Titanium or Manganese treated steel. In combination with the proper switches, stands, etc., it is easily installed; used right or left hand; saves joint bars.

Weir products for mine track work include a wide variety of constructions in frogs, switches, guard rails, clamps, stands, etc.



CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads *Since 1882*

WEIR KILBY CORPORATION

CINCINNATI 12, OHIO Successors to BIRMINGHAM 7, ALA.
WEIR FROG CO. . . KILBY FROG & SWITCH CO. . . CINCINNATI FROG & SWITCH CO.

344 Femco TROLLEY-PHONES

installed in mines in the past twelve months



CONSTANT SUPERVISORY CONTROL
through
CONTINUOUS COMMUNICATION
from mine-mouth to face...

INCREASES TONNAGE

Pays for itself very soon

PROMOTES SAFETY

Quick reports—quick action

SPEEDS OPERATIONS

No stopping to telephone

ACCEPTED AND APPROVED

By men who mine

You talk in a natural voice to any moving or stationary location anywhere in the mine.

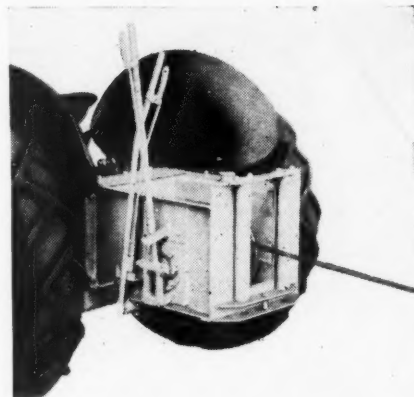
Each station is equipped with a PRESS-TO-TALK MICROPHONE and a rugged, compact speaker.

Ask for demonstration

FARMERS ENGINEERING AND MANUFACTURING CO.

549 BRUSHSTON AVE. · PITTSBURGH 21, PA. · CHURCHILL 5050

Specialists in Underground Radio Electronics



TRACTOR WINCH recently announced by the American Hoist & Derrick Co., St. Paul 1, Minn., and known as the American "Tractowinch," is a single-drum unit, with a maximum capacity of 7,500-lb. single-line pull on the first layer of cable. It is said to be adaptable to many industrial wheel-type tractors and easily installed or quickly removed.

and safer storage and more convenient underground handling. Light in weight and easily opened, the drums replace corrugated cartons formerly used, which sometimes became damaged in shipping and storage.

REPAIR ALLOY—Its new "Lo-Temp" low-temperature bronze-base permanent repair alloy is handled like putty at only 300 deg. and fuses with the metal under repair, according to the John Hewson Co., 70 Wall St., New York 5. Lo-Temp is applicable to any metal except aluminum and its alloys and the finished work can be machined, filed, drilled and tapped, it is said. Lo-Temp reportedly will not corrode, run, crumble, shrink or dry out and an ordinary gasoline torch and a putty knife are the only equipment necessary to apply it.

FIRE EXTINGUISHERS—American-LaFrance-Foamite Corp., Elmira, N. Y., has announced a complete new line of 2½-gal. resistance-welded silicon-bronze fire extinguishers to replace riveted and copper-fabricated units of the same capacity. They include the soda-acid, foam, plain-water and anti-freeze-water types. Each unit is 4½ lb. lighter than the old and are said to be much stronger because of the high tensile strength of the materials used.

ARC-WELDING ELECTRODE—New Airco No. 394 low-hydrogen-type coated electrode designed to prevent under-bead cracking in weld deposits has been announced by Air Reduction Sales Co., New York 17. The new product operates on either a.c. or d.c. and is designed to give welds of 100,000 psi.

COATING—New LC-600 air-drying coating that may be sprayed, dipped, flowed, roller-coated or brushed on almost any clean unpolished de-rusted surface has been announced by Lith-

ONE SUCCESSFUL COAL CLEANING PLANT DESERVES ANOTHER



East Diamond Mine plant of the West Kentucky Coal Company—soon to be duplicated at the Company's Pleasant View Mine.



**LET'S GET
ACQUAINTED!**

R and S is equipped to do the job complete . . . to plan and engineer coal preparation plants from the ground up . . . to furnish modern, automatic operating equipment long recognized as the best money can buy.

These informative bulletins—Nos. 166 and 171—fully describe the units in use in the above plant: the R and S Hydrotator and the R and S Tandem Hydro-Separator . . . each backed by 40-odd years of concentrated experience in coal preparation methods and machines. Write for copies . . . TODAY!

SOON another Roberts and Schaefer coal cleaning plant like the one pictured will rise above the Pleasant View Mine of the West Kentucky Coal Company:

There's deep significance in repeat-contracts like this—obvious proof that into R and S engineered plants go that extra measure of sound design and operating efficiency which makes success and maximum profit foregone conclusions.

Consider your own plant! Is it modern . . . economical . . . equal to the great need for more and better coal . . . safe from the inroads of competition?

If you haven't discussed modern, up-to-date coal preparation methods lately . . . with experts . . . it's very likely you are overlooking handsome profits that you're earning but not getting. Good way to find out is to consult Roberts and Schaefer . . . without obligation . . . with assurance of complete satisfaction if we are privileged to serve you.

ROBERTS and SCHAEFER CO.

130 North Wells Street, Chicago 6, Ill.

2801 Broadway Ave.
PITTSBURGH 16, PA.

P.O. Box 570
HUNTINGTON 10, W. VA.

Everybody's happy

when coal is freezeproofed

with WYANDOTTE
CALCIUM CHLORIDE

DEALERS are dissatisfied when coal arrives frozen in the car. They know that the extra time required to unload it will put them behind on their delivery schedules.

But they're pleased to find coal freezeproofed with Wyandotte Calcium Chloride. This means that it will come out of the car easily, quickly and uncracked. And you'll benefit by their friendly feeling.

Wyandotte Calcium Chloride is economical. You need no special equipment to handle it for freezeproofing. So there's every reason for giving your dealers a break this winter.

Let us tell you more about the advantages of freezeproofing coal with Wyandotte Calcium Chloride. Just send along the coupon.

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division, Dept. 1776
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name _____
Address _____
Title _____

 **Wyandotte**
REG. U. S. PAT. OFF.
CALCIUM CHLORIDE

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division, Wyandotte, Michigan



MAGNETIC STARTERS — Ward Leonard Electric Co., Mt. Vernon, N. Y., has announced a new Bulletin 4111 Size 1 A.C. magnetic starter for across-the-line starting of polyphase squirrel-cage induction motors and single-phase motors. Features cited by the manufacturer include compact unit construction, high arc-interruption capacity; fast, positive and consistent operation, reliable thermal overload protection and complete parts accessibility. The units have a maximum enclosed rating of 7½ hp., 440-550 volts, three phase, 60 cycles.

gow Corp., Chicago 9. Applied without primer, the synthetic-resin coating reportedly is positively resistant to acids, alkalies, chlorides, oils, salts, oxygen and alcohol solutions and is odorless and tasteless.

ELECTRODES—Four new electrodes have been announced by the Welding Equipment Divisions, General Electric Co., Schenectady, N. Y. Type W-60, with a low-hydrogen coating, manganese-moly analysis and good usability characteristics, is said to be suitable for welding most hardenable steels where hazards of under-bead cracking are to be eliminated. Type W-61, a low-hydrogen electrode of a moly-vanadium composition, can be used with either a.c. or reverse-polarity d.c. to weld a wide variety of low-alloy steels. Type W-62, a low-hydrogen titania-coated electrode of 2½-percent nickel composition, can be used on steel castings of a similar analysis and for producing weld deposits having high impact properties at sub-zero temperatures. Type W-95 is designed to deposit extremely hard wear-resisting weld metal in all positions, using a.c. or d.c.

CHEMICALLY INERT PAINTS—A line of chemically inert paints and coating materials, made of chemically inert resins which are resistant to acids, alkalies and most other corrosive substances, has been made available by Morton Chemical Co., Greensboro, N. C. Called Duramites, the new products may be applied by brush, spray or dip and may be air

How
PIERCE
FUSE
SURGE
CONTROL
SAVES TIME.. CUTS
PRODUCTION LOSS!

Through a close control of the current surge which results from low or momentary high overload, PIERCE Fuses keep your production line humming. No unnecessary shutdowns . . . no lost labor time . . . no production sag, when PIERCE Fuses are in your plant!

Here's how PIERCE Fuses produce cost-saving Surge Control:

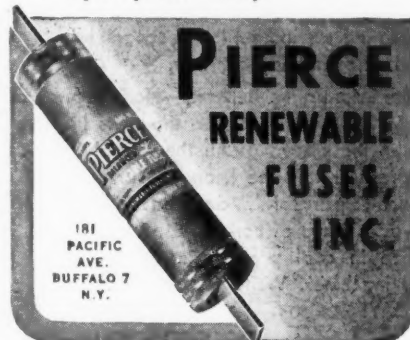


BALANCED LAG LINK — creates more lag at low overloads — where it is necessary and harmless; gives Safe lag at high overloads.



SCREEN VENTILATION —takes in cool air and allows escape of heat and gases, reducing unnecessary fuse blowing and banishing dangerous "afterblow".

GET THE FULL STORY of the cost-saving Surge Control features of Pierce Renewable Fuses. Write for descriptive folder--today!



PIERCE
RENEWABLE
FUSES,
INC.

181
PACIFIC
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N. Y.

FOSTER'S

Light-Weight
**CORRUGATED
INTERLOCKING
STEEL-SHEET
PILING**

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L. B. FOSTER CO.
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GUARANTEE

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RAIL • TRACK ACCESSORIES



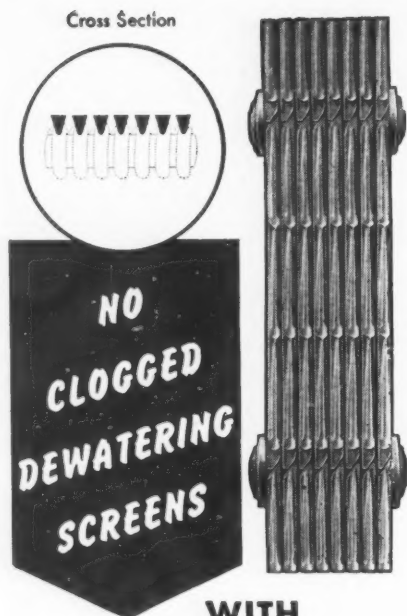
SINCE 1902

PILING • PIPE • WIRE ROPE

L. B. FOSTER COMPANY

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4 • HOUSTON 2 • SAN FRANCISCO 4

Five convenient warehouses for prompt delivery



WITH Cambri-Wedge WEDGE WIRE SCREENS

Made under the famous British Wedge Wire Co. patent—Cambri-Wedge Riffle Surface wire screens for dewatering operations in washeries reduce the danger of clogged screen openings. Unique wedge-shaped screen members combine maximum water removal with absolute rigidity of the screen itself. Cambri-Wedge offers longer life, too—up to 4 times as long as other type screens as shown by actual use.

Cambri-Wedge wire screens are available in a wide range of metals, including stainless steel—with mesh openings from .005" up—in any length or width of flat or Riffle Surface.

FREE FOLDER—

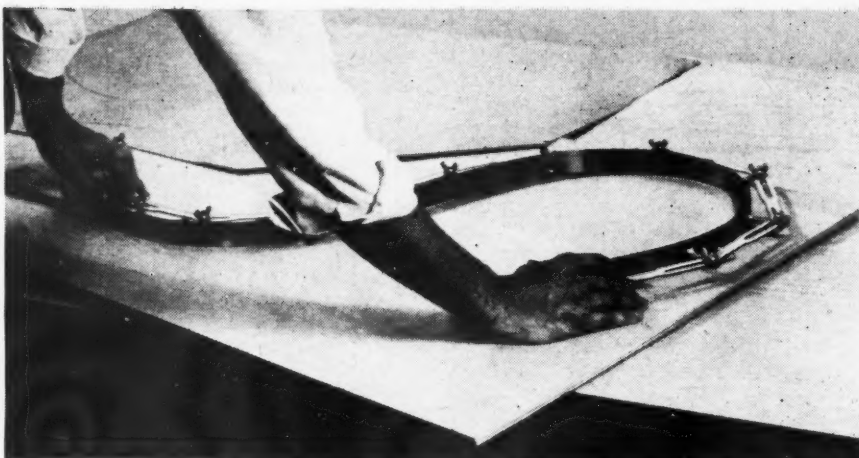
See how wedge wire screens can save you money, produce cleaner coal, speed your washery production. Write direct today, or call Cambridge Sales Office nearest you, for this free folder describing Cambri-Wedge Wire Screens.



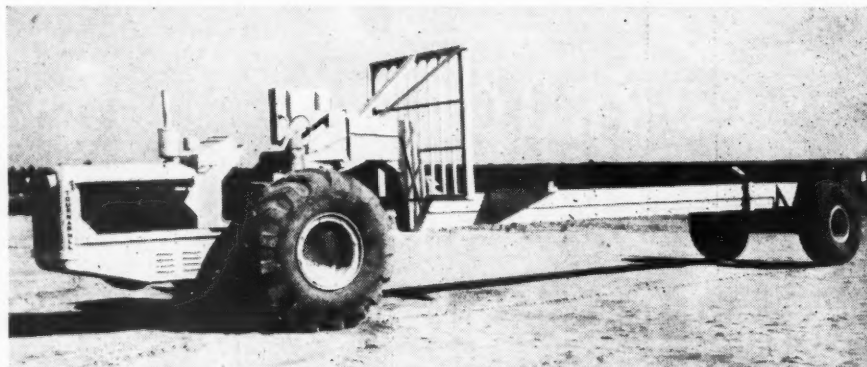
Cambridge
WIRE CLOTH CO.

Department M • Cambridge 8, Md.

VISIT OUR BOOTH NO. 1424 AT THE
METAL EXPOSITION, PHILADELPHIA



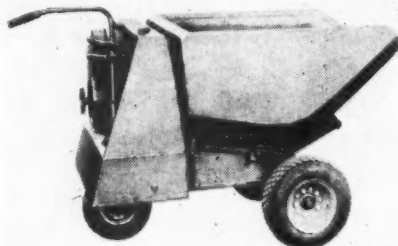
NEW FLEXIBLE TEMPLATE measurably reduces layout work by duplicating curves full size from blueprints or drawings in a few seconds, according to C. H. Clark and W. E. Poggenburg, sales agents, 4900 Wynnefield Ave., Philadelphia. The unit can be set and locked to any desired shape, contour, curve or radius and transported anywhere for construction or checking purposes, and when unlocked springs back to its original shape ready for reuse. It is available in 1-ft. lengths, minimum length, 2 ft.



FOR BOTH OFF-ROAD and highway travel, this new TH-4 Tournahauler announced by the Tournalayer Division, R. G. LeTourneau, Inc., Longview, Tex., is a 45,000-lb.-g.v.w. vehicle designed to haul heavy length loads such as pipe, timber and steel, etc. According to the company, not only can the unit navigate the mire, sand, grades and sharp turns of off-road travel but it also provides efficient haulage on the highway. The unit is equipped with extra large low-pressure tires to provide flotation in difficult haulage conditions and has an electric-power steer permitting full 90-deg. turn of the Tournapull.

dried or baked. The complete line includes products for high- and low-temperature processing, anti-corrosive maintenance painting, masonry and concrete, as well as chemical-resistant floor finishes.

a rated capacity of 10 cu. ft. or approximately 1,000 lb. The rubber-tired unit is equipped with finger-tip control of speeds from 2 to 4 m.p.h. both forward and reverse, and has an instantaneous gravity-dump body and a simple steering device that turns the machine in its own length.



WEIGHING UNIT — New M-118-D automatic weigher announced by Streeter-Amet Co., Chicago 13, is said to automatically print and visually indicate dormant loads of 1,000 to 100,000 lb. rapidly and accurately. While attractively styled, the unit is reportedly designed for exacting service in the dust and moisture of heavy operations.

POWER WHEELBARROW, the "Mo-to-Bug" manufactured by Kwik-Mix, Port Washington, Wis., is powered through a V-Belt drive from an air-cooled 3.9-hp. gasoline engine and has

IMPROVED FLUX COATING — Chemical and metallurgical improvements in flux-coated welding rods to allow greater and thinner flow of the joining alloy have been made by Eutectic Welding Alloys Corp., 40



NEW "WINCH-LIFT" dump truck manufactured by Winch-Lift, Inc., Shreveport, La., incorporates a new and unusual dump principle. Bed is raised by winch cable and sheave-block assembly with the truck engine providing power through a take-off. As the winch pulls in the cable, a sheave block attached to the fifth wheel and another just ahead of the trailer axle are pulled together, closing the gap between trailer and truck and forcing two tubular arms attached to trailer and truck to jackknife and raise the bed. The 8-cu. yd. model is said to weigh 5,600 lb., some 5,000 lb. lighter than nearest competitive semi-trailer dump unit. The winch-lift dump trailer is made in 20- to 30-cu. yd. sizes for coal haulage. Added feature reported is the unit's ability to pull itself out of mud or walk itself through mud unaided.

Worth St., New York 13. The new rods are said to permit welds at heats far below ordinary welding and brazing rods, whether bare or flux-coated. The coating is available on EutecRods 14FC for cast iron; 16FC for all steels; 18FC, 183FC and 184FC for copper, brass and bronze; 20FC for monel, nickel and nickel alloys; 210FC and 21FC for aluminum and aluminum alloys; and 185FC for machinable hard overlays.



THIS DRILL BIT treated with Tungweld, new tubular hard-facing electrode recently announced by Lincoln Electric Co., Cleveland 1, Ohio, drilled 900 percent deeper than normal hot-forged bits before needing refacing. The electrode is made in two forms. Tungweld-C contains in the tube coarse particles of tungsten carbide and is recommended for surfacing earth-cutting tools where a jagged, self-sharpening edge is required and for severe abrasion. Tungweld-F contains fine particles of tungsten carbide and produces a smoother, thinner and sharper edge.

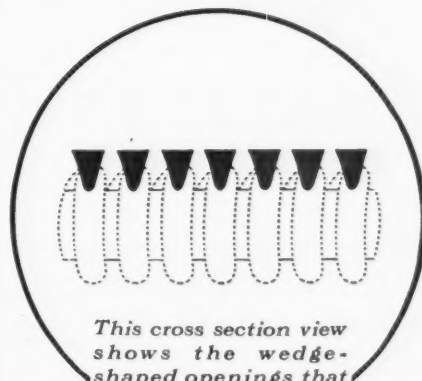
SPEED REDUCER—New "Win-smith" patented helical-gear differential speed reducer, according to the Winfield H. Smith Corp., Springville, N. Y., offers, in addition to features of previous models, direct centered load distribution, more rigid and vibrationless mounting and larger area for heat radiation. The new design permits increased overhung load capacities for greater operating economy and efficiency. Six sizes are available, in horizontal, vertical and flange-mounted types.



IMPROVED MODEL of the Simplex No. 9225 mine-timber jack is reported by the manufacturer to be specifically designed to reduce mine-timbering costs. A speedy double-acting mechanism that lifts or lowers on both the up and down stroke operates directly on the tubing, eliminating rack-bar weight. The unit weighs 57 lb. and has a minimum height of 57 in. closed (37 1/4 in. lift).



Cambri-Wedge WEDGE WIRE SCREENS speed production in DEWATERING and CLASSIFIERS



This cross section view shows the wedge-shaped openings that insure freedom from clogging, permit free drainage at all times.

FREE TO MINE OPERATORS

Mail coupon today for your free copy of this folder describing Cambri-Wedge wire screens. See how they can save processing costs and speed production in your coal preparation plant.



Cambridge WIRE CLOTH CO.

Department M • Cambridge 8, Md.

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Cambridge Wire Cloth Company
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Cambridge 8, Maryland

Please send me - - FREE - - the folder on Cambri-Wedge wire screens.

Company _____

Address _____

My name _____

**HOLDS
ITS
GRIP!**

RUBEROID INSULATING TAPE

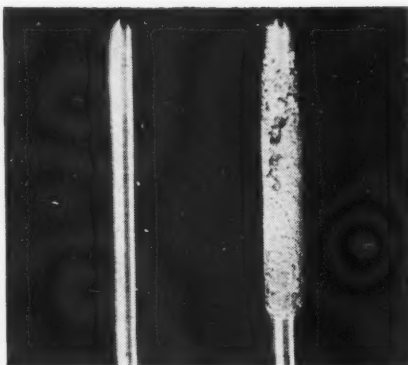
• Tough and waterproof, Ruberoid Insulating Tape holds its grip no matter how it's abused. For over 60 years it's been first choice for wrapping mining machine cables. Here are the reasons:—only Ruberoid Insulating Tape has all these seven important features!

1. Double grip—both sides adhesive
2. Great tensile strength
3. Won't tear, ravel or pucker
4. Resists abrasion
5. Acid and alkali proof
6. Extra thick—one layer insulates
7. Exceeds A.S.T.M. specifications...
 - by 300% in adhesiveness
 - 26% in tensile strength
 - 290% in dielectric strength!



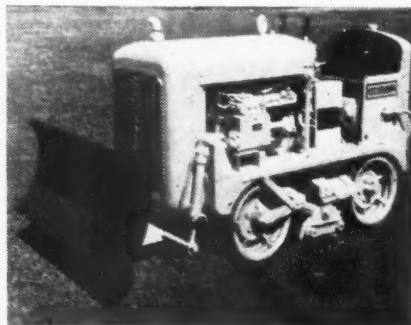
The RUBEROID Co.

QUALITY BUILDING MATERIALS
500 Fifth Ave., New York 18, N. Y.



EFFECT OF NEW RUST INHIBITOR, RD-119, now being added to all petroleum products of the Sinclair Refining Co., is shown above by a comparison of a steel bar immersed in RD-119-treated kerosene (right) and a bar covered with rust after immersion in untreated kerosene (left). The compound is expected to eliminate costly stoppages and repairs from rust and scale caused by moisture condensation in engines using its gasoline, kerosene or diesel oil as fuel, according to Sinclair.

WELDING ROD — New Eutecrod 1805FC announced by Eutectic Weldings Alloys Corp., New York 13, is designed for joining copper and is said to be a thin-flowing, low-melting "brazing-type" alloy with an unusually high tensile strength. It is available in 1/4-, 3/16-, 3/32- and 1/8-in. flux coated and 1/16-in. bare.

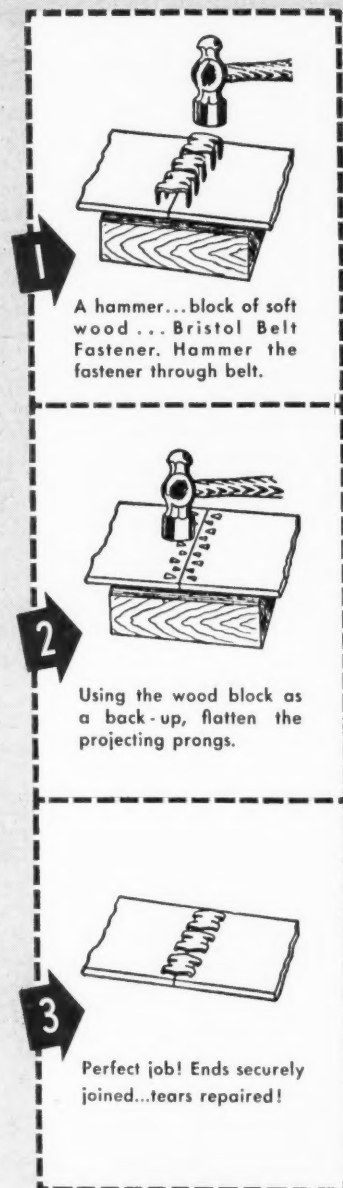


NEW ADDITION to its Model 60 crawler-type compressor, a hydraulically operated backfill blade, has been announced by Schramm, Inc., West Chester, Pa. Hydraulic pressure is supplied by a hydraulic pump which is a self-contained unit with pressure-relief valve, hydraulic reservoir and pump in one housing. The blade is moved by two hydraulic cylinders, travels 14 in. above ground and 11 in. below ground level. The unit can be used for light grading as well as back-filling.

Industrial Notes

Westinghouse Electric Corp., Pittsburgh, has elected A. C. Monteith vice president in charge of engineering

The Simplest Method Of Joining And Repairing Belts



1 A hammer...block of soft wood... Bristol Belt Fastener. Hammer the fastener through belt.

2 Using the wood block as a back-up, flatten the projecting prongs.

3 Perfect job! Ends securely joined...tears repaired!

Keep these fasteners handy for quick, lasting repairs.

Order from your distributor

THE BRISTOL COMPANY
Mill Supply Division
139 Bristol Road, Waterbury 91, Conn.

Five Times



MORE POWERFUL THAN DYNAMITE!

Although the release of power from coal is accomplished by different means than are used with dynamite, the measurable power produced shows a one-to-five variance in favor of coal!

—BUT THIS ENERGY CAN BE LOST FROM COAL BY IMPROPER CLEANING

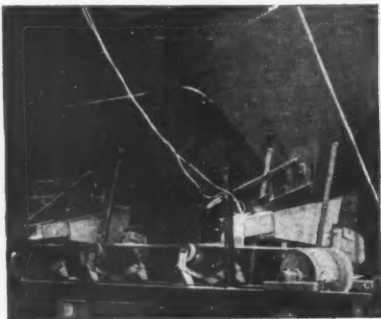
Your coal has a tremendous power potential . . . *but* this energy can be lost from the coal by improper cleaning and preparation methods. The most important markets are buying scientifically prepared coal because they know it will deliver the most power per pound and the most value per dollar. Are your preparation methods producing coal of uniformly high chemical and physical quality to attract and hold these premium markets?



FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning



SYNTRON

"Vibra-Flow"

VIBRATORY FEEDERS

Will Handle—

—various grades of coal—
and other types of bulk
materials.

At—

—variably controlled rates
from pounds to 500 tons
per hour—from 110, 220
or 440 volt, 50 or 60 cycle.

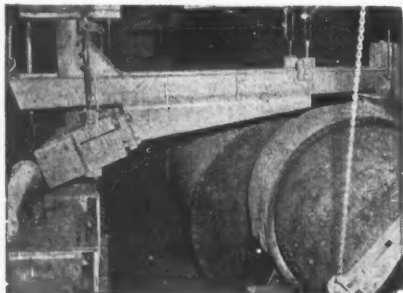
To—

—screens, belt conveyors,
crushers, loading bunkers,
etc.

An illustrated folder is
available, or—if you'll send
us the details of your prob-
lem—description of mate-
rial to be fed, maximum
feed per hour, desired
length of trough, etc.—our
Engineering Department
will be glad to submit their
recommendations.

SYNTRON CO.

975 Lexington, Homer City, Pa.



and research, succeeding Marvin W. Smith, recently named executive vice president of Baldwin Locomotive Works. Mr. Monteith joined the company in 1923 as a graduate student engineer in the training course and was assigned to the central station engineering department in 1924. He became manager of that department in 1938 and in 1941 was named manager of the industry engineering department. In 1945, he took over the dual position of manager of headquarters engineering departments and director of education.

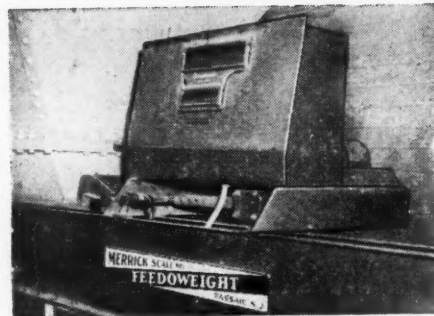
Thermoid Co., Trenton, N. J., has elected Lloyd R. Leaver, president of Joseph Stokes Co., Ltd., Welland, Ont., Canada, a vice president of the company. In his new capacity, Mr. Leaver, who joined originally the Thermoid organization in 1921, will manage Thermoid's industrial rubber products division. He will continue to direct the policies of the Canadian subsidiary from Trenton.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed W. L. Manly manager of dealer sales, succeeding W. A. Meyer, who has been named assistant manager of the Texrope Drive department. Mr. Manly joined A-C in 1937, serving in the water-conditioning department, where he has been manager since 1942. With Allis-Chalmers since 1926, Mr. Meyer successively served in its milling machinery, Texrope, and central sales departments, and was manager of general purpose equipment sales before he assumed charge of the A-C dealer organization.

The B. F. Goodrich Co., Akron, Ohio, has announced plans for a multi-million-dollar plant for the manufacture of industrial rubber belting to be built in Akron. Requiring razing of four factory buildings to permit its construction, the plant will contain 150,000 sq. ft. of floor space and will feature unusual height and heavy construction, with equipment especially designed for the manufacture of various types of belting. The new facility is expected to enable the company to handle any belt requirements including 72-in. belting and any weight or length of finished belting roll that can be shipped on a drop-center flat car.

Flood City Brass & Electric Co., Johnstown, Pa., has appointed Owen Hughes a sales representative to cover Pennsylvania west of Cambria County, Blair, Bedford and Huntington Counties, and the northern part of West Virginia and Maryland. Mr. Hughes formerly was associated with the Westinghouse Electric Corp. and the Sewell Coal & Coke Co.

Firth Sterling Steel & Carbide Corp., McKeesport, Pa., has announced reorganization of operating personnel and a change in sales and manufacturing policy in its Carbide Division. Major personnel changes



THE MERRICK FEEDOWEIGHT

Reg. U. S. Pat. Off.

tells rate per hour
—weight per day

A self-contained automatic conveyor scale, combined with automatic gate to give feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Feed rate may be varied. Large feed opening insures even flow. Uniformly feeds bulk material BY WEIGHT; and automatically totalizes weight of materials fed. Durable. Simple to operate. Rugged, heavy duty design. Slow moving parts means long life. Easy to install and maintain.

Manufacturers of

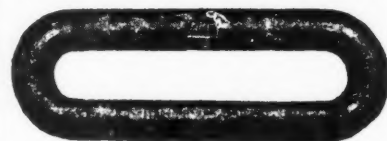
The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.

Engineers and Mfrs. of Automatic
Weighing Equipment

PASSAIC, N. J., U. S. A.

**FOR SAFETY'S SAKE,
SUPERIOR COUPLINGS**



Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

**DROP FORGED SWIVEL
COUPLINGS**

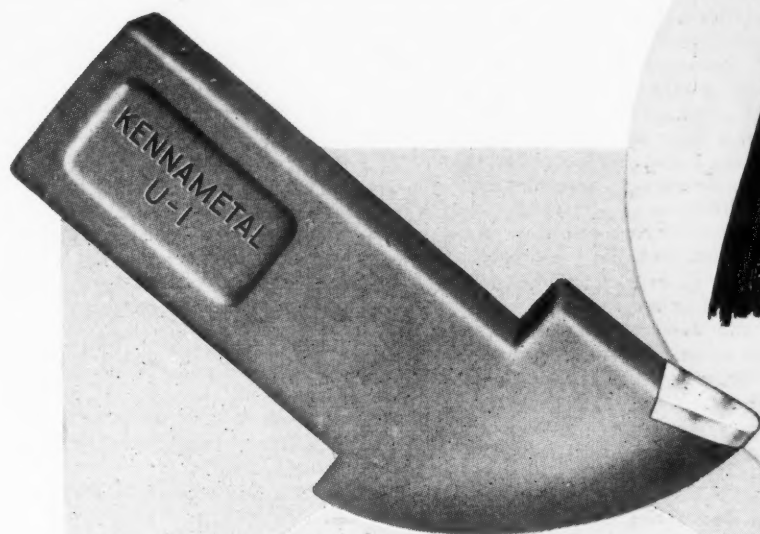


**PITTSBURGH
KNIFE & FORGE CO.**

1421 Reedsdale St., N.S.

Pittsburgh 12, Pa.

A Kennametal bit that cut



175

places before it
was sharpened

1000

places before
wearing out

These are figures taken from performance data collected by a satisfied user of Kennametal cutting machine bits in a Washington County, Pennsylvania coal mine. Comparing Kennametal bits with steel bits cutting coal in the Pittsburgh seam, mine operators found that steel bits cut 4 places before sharpening; Kennametal, 175. A margin of 171 places with Kennametal under conditions that were identical. A thousand places were cut before the bits wore out, about 16,000 tons of coal mined. And the bit cost figured only .4 of one cent per ton.

This mine used the new bits on a Jeffrey 35BB cutting machine having a 9' bar, and 9' by 12' places were cut at the rate of 13 minutes per place. When steel was used it took 18 minutes per place, and the cutting machine consumed 25 to 33% more power. Moreover, enough time was saved in an

eight-hour shift to pay for all the 42 Kennametal bits in the cutter bar chain. Such facts as these help to explain why more and more coal mines use Kennametal bits every day. And why they may be able to help you bring about more economical coal cutting.

If you would like a demonstration, our representative in your district will be glad to contact you. Simply write—Mining Division, Kennametal Inc., Latrobe, Pa., giving your name and address. As prompt delivery can be made, we suggest you write today!



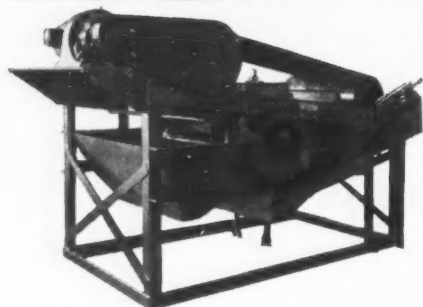
KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

DINGS TYPE SF CROCKETT SEPARATOR

makes the
Heavy-Media
Concentration Process
PRACTICAL



PEAK EFFICIENCY REQUIRES A CLEAN MEDIUM

Dings Type SF Crockett Separators, designed specifically for the purpose, keep the Heavy-Media Process at constant peak efficiency . . . assure maintenance of the proper specific gravity and purity of the ferrous medium that makes possible the most efficient and economical recovery of usable coal from your mine run.

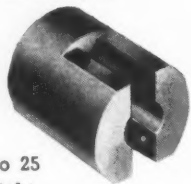
Dings Magnetic equipment, both electromagnet and permanent, covers a wide range of purification, separation and iron removal jobs in coal processing procedures. Ask for Catalog 550 for detailed information on Type SF Crockett Separators, and for literature on Dings complete line of magnetic equipment.

DINGS MAGNETIC DRILL EXTRACTOR

Saves redrilling to recover drill rod or bits broken off in the blast hole.

Powerful Alnico Extractors lift up to 25 times their own weight.

Easy to use . . . can be carried in a pocket. Write for details.



DINGS MAGNETIC SEPARATOR CO.
4720 W. McGough Ave., Milwaukee 14, Wis.

"Separation Headquarters
Since 1899"

Dings

"HIGH INTENSITY"

include the appointments of W. J. Loach as manager of carbide development and quality control; Charles W. Iams, Jr., manager of carbide production and fabrication at the McKeesport plant; E. G. Moffat, works manager of the recently completed plant at Milford, Conn.; and A. B. Vestal, superintendent of plant engineering at McKeesport. Gilbert B. Richards, formerly general sales manager of Bostitch, Inc., has been named general sales manager. Under its new sales and manufacturing policy, the company will concentrate on the manufacture of sintered carbide metals in all forms and standard single-point tools and dies. However, the fabrication of other carbide tools and dies will be continued where carbide is in the development stage or no adequate commercial tool and die making facilities are available. These changes reportedly will enable Firth Sterling to place greater emphasis on research and development to expand the uses of sintered carbide metals.

Gar Wood Industries, Inc.—Findlay Division, Findlay, Ohio, has appointed John D. Blood service manager for the division. Mr. Blood joined Gar Wood in April, 1943, as a draftsman, and later became product engineer for the Buckeye line.

American Car & Foundry Co., New York, has appointed Sheldon Thomas assistant district manager of the company's Chicago plant. He was formerly assistant to Robert W. Ward, vice president in charge of production.

General Electric Co., Schenectady, N. Y., has appointed A. H. Graham manager of its d.c. armored motor engineering division, small and medium motor divisions, Erie Works. Mr. Graham, who joined G.E. in 1939, has been section engineer, design section, d.c. armored motor engineering division, since September, 1947.

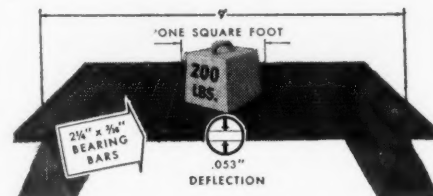
Paul Weir Co. and Mines Engineering Co., Chicago, have announced that Louis K. von Perbandt and Lee R. Richards, engineers for the companies, last month left for the British Isles to serve the National Coal Board as consultants on special problems.

Koehring Co., Milwaukee, has named John S. Conway, formerly export sales manager, general sales manager of the company. John E. Chadwick has been made assistant sales manager and R. E. Stewart export sales manager. Mr. Conway succeeds J. F. Robbins, who has become president and general manager of the Capitol Equipment Co., a Koehring distributor in Harrisburg, Pa.

Nelson L. Davis Co., Chicago, has elected G. H. Bergstrom, chief engineer, a vice president of the company.

Marion Power Shovel Co., Marion, Ohio, has named David E. Rizor assistant to John P. Courtright, vice president in charge of sales. Mr. Rizor has been with Marion for 24

For **STRENGTH** specify **TRI-LOK** RECTANGULAR OPEN STEEL FLOORING



The locked-in strength of Tri-Lok enables it to stand up under heavy loads—even on long spans. No rivets, bolts, or welds are used in the construction of Tri-Lok; this feature eliminates the possibility of loose joints.

Tri-Lok is also available in Diagonal, or Super-Safety U-type Flooring, and in Stair Treads of all types. Write for Bulletin KR 1140.

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National Distributor for the
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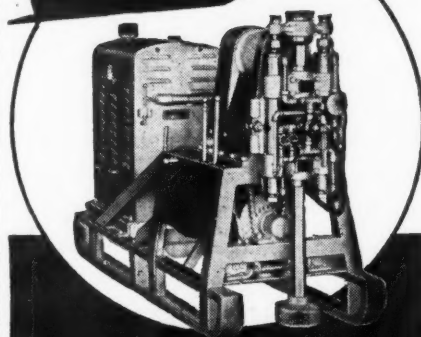
Dravo Bldg., Pittsburgh 22, Pa.

Sales Representatives
in Principal Cities



Diamond Core Drilling

CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

Above ground, too...

RELIANCE

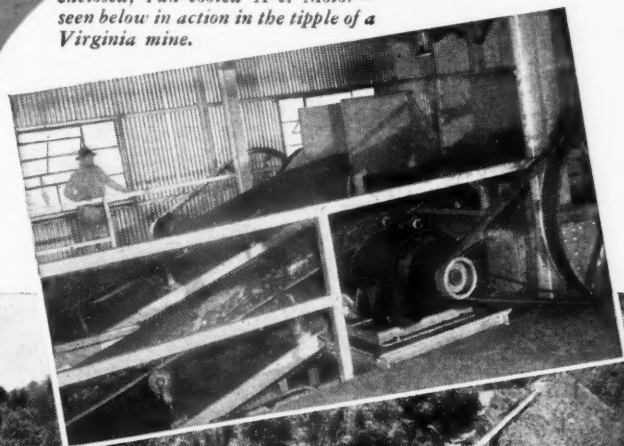
Precision-Built

MOTORS

do a *Good* Job
on the *Tough* Jobs!



Reliance Precision-Built Totally-enclosed, Fan-cooled A-c. Motor—seen below in action in the tippie of a Virginia mine.



Wherever coal is mined, more and more operators are discovering that Reliance Precision-Built A-c. Motors provide the maximum in dependable and economical power on every job above and below ground.

These rugged, long-lived motors applied to shaking and vibrating screens, washers, pumps, air tables, crushers and other preparation equipment will offer you invaluable assistance in keeping production up and costs down. It will pay you to write today for descriptive data contained in Bulletin C-125 for Totally-enclosed, Fan-cooled A-c. Motors, or Bulletin C-130 for Explosion-proof Motors.

Sales Representatives in Principal Cities

RELIANCE ELECTRIC AND ENGINEERING CO.

1055 IVANHOE ROAD • CLEVELAND 10, OHIO

"Motor-Drive is More Than Power"

years and for the last 12 years was district manager in charge of the Chicago office. C. M. Gegenheimer, formerly St. Louis manager, succeeds Mr. Rizor as Chicago district manager. A. W. McGraw has been named manager at St. Louis.

Trade Literature

Available Without Charge on
Request to the Manufacturer

DIESEL-ENGINE MAINTENANCE—Cummins Engine Co., Inc., Columbus, Ind. Three new bulletins describe the design, performance and facilities for serving Cummins diesel engines. Bulletin No. 5275, "The Exclusive Cummins Fuel System," is a non-technical description of the system of fuel delivery and injection used in Cummins diesel engines. Bulletin No. 5276, "On-the-Job Performance," describes the application of Cummins diesels to trucks, shovels, earthmovers and other equipment used in the construction and materials-handling industries. Bulletin No. 6202-3, "Dependable Service for Dependable Diesels," is a large wall map showing

the location of Cummins sales, service and parts facilities throughout the world, including the address, telephone number and service personnel of each of the more than 200 authorized sources of Cummins service.

SCREENS—Hendrick Mfg. Co., Carbondale, Pa. Bulletin illustrates the Hendrick line of flanged lip screens for coal sizing and dewatering. Sizes available are listed for short-slot, medium-slot, long-slot and special-slot lip screens, together with their round-hole equivalent.

PORTABLE AIR TOOLS—Independent Pneumatic Tool Co., Aurora, Ill. Catalog Sheet No. MC-1 illustrates and provides specifications for the Thor line of portable air tools for mining and construction.

BATTERY CHARGERS—The Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio. Bulletin No. 222 covers the company's multiple-circuit battery chargers. Installation and operating features of the unit are illustrated and described.

POWER TOOLS—Syntron Co., 975 Lexington, Homer City, Pa. Catalog No. 486 illustrates and describes the entire line of Syntron power tools. Included are portable electric hammers, 100-percent self-contained gasoline-hammer paving breakers, external concrete form vibrators, internal flexible shaft concrete vibrators, and a com-

plete range of sizes of portable electric drills, grinders, sanders and their accessories.

AIR HOSE—B. F. Goodrich Co., Akron, Ohio. Bulletin describes and illustrates the new Highflex lightweight air hose for small pneumatic tools, said to be as flexible as a lamp cord and weigh less than half as much as the conventional-type air hose for this service.

PREFABRICATED BUILDINGS—Armco Drainage & Metal Products, Inc., Middletown, Ohio. Bulletin, "More for Your Building Dollar," illustrates the uses and advantages of Standard Armco Steelox buildings and offers general data on range of sizes, types of doors and windows, partitions, ceilings, louvers and ridge ventilators. One of the three editions of the bulletin describes specific applications in the mining industry.

ELECTRODES—Wilson Welder & Metals Co., Inc., 60 East 42nd St., New York 17. New electrode catalog contains 50 photographs and diagrams, an electrode selector chart and complete details on all the electrodes in the Wilson line. Typical data supplied include general description, application, welding procedure, mechanical properties, and specifications.

ELECTRIC MOTORS—The Lima Electric Motor Co., Dept. J, Lima, Ohio. Bulletin No. MB-1 covers the Lima line of electric motors, multi-speed gear-shift drives, pedestal grinders and polishing and buffing lathes. Details of construction and features are illustrated with cutaway views.

ELECTRIC SHOP DRILL—Precision Equipment Co., 2658 North Long Ave., Chicago 39. Folder features the new Fairchild 1/4-in. drill and the Hi-Power 1/2-in. model.

FLOOR MAINTENANCE—Stonhard Co., 1306 Spring Garden St., Philadelphia 23. Folder, "One-Two-Three," outlines three simple steps in repairing ruts and holes in floors with Stonhard Stonfast, with no delay in production schedules or traffic.

STEEL—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80. Bulletin describes RYTENSE AA, a medium carbon-manganese free-cutting machinery steel, and includes details of strength, machinability rating, typical analysis, mechanical properties, and hardness at various tempering temperatures.

EARTH-MOVING EQUIPMENT—The Euclid Road Machinery Co., Cleveland 17, Ohio. "Euclids Move the Earth," a new 30-minute full 16-mm. sound film covering Euclid's complete line of off-the-highway earth-moving equipment, is now available for booking by interested parties. Shot by the company's cameramen, the film is a pictorial on-the-job movie of the various applications of earth-moving equipment in metal, non-metallic and coal strip mines, highway and railroad projects, airports, dams, levees and other large construction programs.

HARD-FACING—Air Reduction Sales Co., 60 East 42nd St., New York 17. Booklet covers the complete new line of Airco hard-facing alloys and includes data on typical uses, specifications, application technique, deposit hardness, color markings and deposit analysis.

ELECTRIC MOTORS—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Bulletin No. 05B-6107A, "Motors for Driving Power-House Auxiliaries," describes motors of 1 hp. or larger, with data on types and characteristics of A-C induction motors, construction details and special features of standard open-type motors, and totally-enclosed fan-cooled motors. Also included is a handy motor-section chart.

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MINE MECHANIZATION
MINE MANAGEMENT

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Model HL 1 1/4 yard Payloader piling spillage under stripping shovel.



Model HF 3/4 yard Payloader cleaning last overburden from the vein.



Hough Bulldozer-Shovels in 1 and 2 yard sizes are available for International Crawler Tractors, Models T9, TD9 and TD14.

a Hit in the Pit!

HOUGH PAYLOADERS

PATENT 2,412,329

... Reduce Breakage Save Coal • Increase Production!

Strip mines are saving many tons of coal by using Payloader Shovels to clean the vein, because their pneumatic tires do not chop and grind the coal. One mine, producing 6000 tons per day credits its Model HL Payloader with saving up to 150 tons of coal daily. Model HL and Model HF Payloaders also pay dividends in other ways at the pit . . . feed and clean up spillage for both stripping and coal-loading shovels, load odd coal lots, load and spread road surfacing materials, handle spoil, grade paths for draglines . . . move drills, cable, mats, pumps and tools. Around the tippie they also load, level, clean-up, haul, lift and push. Bulldozer Blade and Crane Hook attachments are available to increase Payloader usefulness. Write today for facts, literature and the name of your Hough distributor.

THE FRANK G. HOUGH CO.

705 SUNNYSIDE AVENUE,



LIBERTYVILLE, ILLINOIS

TRACTOR SHOVELS SINCE 1920

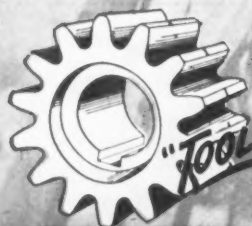
**YOUR PROFITS ARE IN DIRECT
PROPORTION TO THE NUMBER
OF "TOOL STEEL"
PROCESS PARTS USED**



All "Tool Steel" parts are guaranteed to handle more coal than any other products used in the same service.

Their maintenance records show a superiority of trouble-free service that in many cases exceeds a ratio of 13 to 1.

These profit facts speak for themselves. Write today for complete information.



**"TOOL STEEL"
PROCESS**

The Standard of Quality

for GEARS • PINIONS • SPROCKETS • WHEELS and other HARDENED PRODUCTS

THE TOOL STEEL GEAR & PINION CO.

CINCINNATI 16, OHIO



Most Advantageous

... Because it costs so little more, there's no longer one valid reason for using any wire rope but

Preformed Wire Rope

Ask your manufacturer or distributor to tell you why Preformed wire rope lasts so long, why it handles so easily, and why it saves you so much time and money.

All in the day's work - -

All that's needed in a shift's cutting operation is a pocketful of Bowdil Throw-away Bits per machine. This ease of handling and changing make Bowdil Bits popular with MACHINE operators . . . long life and coarse cuttings at low cost make them popular with MINE operators. And there's no economy in resharpening bits when you get so many tons per point. Write for complete information on all Bowdil Cost-Cutting Coal Cutting Equipment.



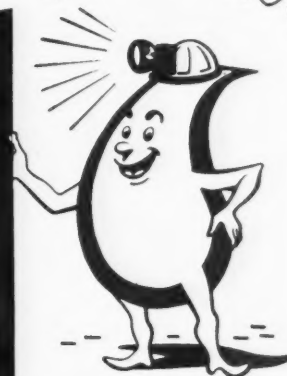
BOWDIL 
COAL CUTTING EQUIPMENT
CANTON OHIO



**Customers' homes maintain
an even heat when . . .**

Proper Preparation provides

**BETTER
STOKER FEED**



**DUST
PROOFING**

**FREEZE
PROOFING**

**LESS
WINDAGE
LOSS**

**CLEAN
HANDLING**

**PERMANENT
ODORLESS
TREATMENT**

**with PERMATREAT
Coal Spray**

Coal treated with Ashland Permatreat Coal Spray makes an easier-to-handle stoker fuel, which burns more completely and uniformly, without channeling. Permatreat Coal Spray tends to prevent corrosion, lubricates stoker mechanism and lessens the causes of stoker breakdown.

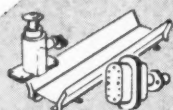
Stoker customers will always ask for coal treated with Permatreat Coal Spray once they've found how much cleaner and better it works in their stokers. Ashland will gladly send you complete information on the application of Permatreat. Write today, no obligation.



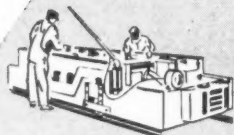
**ASHLAND OIL
& REFINING COMPANY**
Ashland, Kentucky

At your Service...

National Mine Service Company

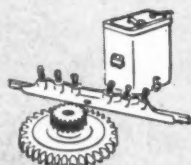


Distributors of original repair parts for JOY, SULLIVAN, LA-DEL equipment.



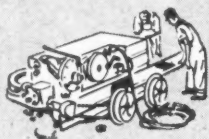
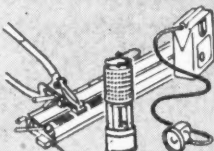
Building and rebuilding mine locomotives.

Motor rewinding and electrical repairs.



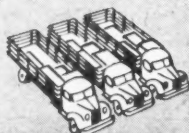
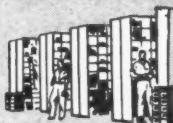
Manufacturers of cable reels, controllers, cable guides, locomotive headlights, trolley wire splicers, journal liners, replacement parts for mining equipment.

Exclusive distributors of WHEAT Electric Cap Lamps, KOEHLER Flame Safety Lamps, HAYDEN Belt Fastening Equipment.



Repair and rebuilding of mining machines and equipment.

Large stocks of mine supplies maintained at our five conveniently located warehouses.



Prompt pick-up and delivery service by regularly-routed trucks.

Our business is essentially one of *service*, furnishing the convenience of "off-the-shelf" buying and, in many sections, "to-your-door" delivery.

Extensive manufacturing, repairing, warehousing and distribution facilities are maintained. National's five divisions and divisional warehouses (two newly established within the year) are centrally located in principal coal producing fields. From them a large fleet of trucks operates on regular schedules. They deliver your orders, pick up repair work and simplify your maintenance, equipment and supply problems.

Call our nearest division office today and let us demonstrate what *real* service means.



Write for your copy of the National Stock Report.

NATIONAL MINE SERVICE COMPANY

Has the facilities . . . Delivers the goods

BEMECO DIVISION	ALL-STATE DIVISION	KENTUCKY-VIRGINIA DIVISION	ANTHRACITE DIVISION	WESTERN KENTUCKY DIVISION
Beckley, W. Va.	Logan, W. Va.	Jenkins, Ky.	Forty Fort, Pa.	Madisonville, Ky.

Direct field representatives covering the major coal producing areas.

When rock bars your way to tonnage



Gardner-Denver S33 Sinker



When rock bars your way . . . when you need a fast, light, powerful drill . . . you'll find the Gardner-Denver S33 Sinker a handy aid to increased coal tonnage. Weighing only 31 pounds, this drill is light enough for work in hard-to-reach spots—yet has the speed and power to establish performance records. An easy riding drill with exceptional hole cleaning ability, the S33 is ruggedly built for tough service. No wonder it is known as the champion in its weight class.

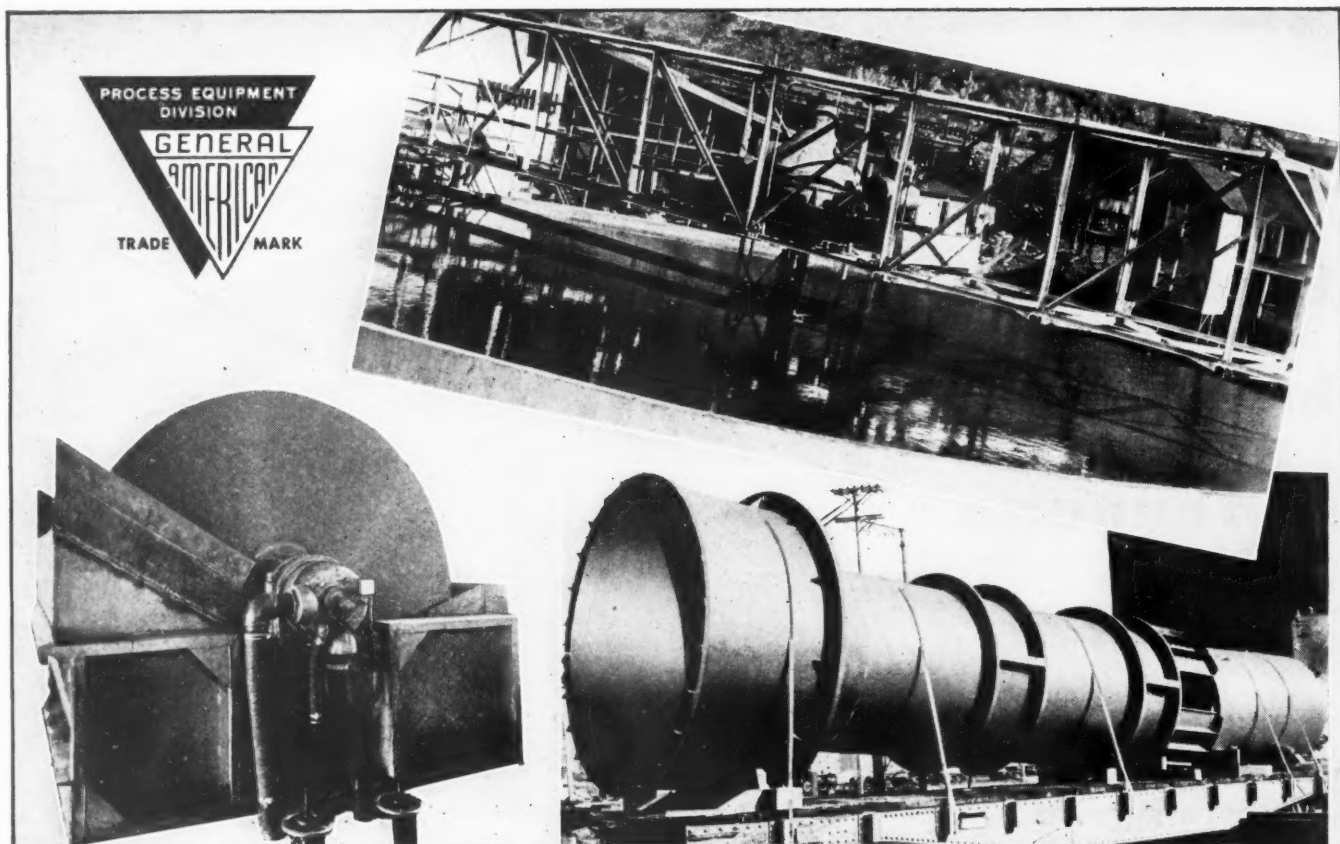
Other features you'll like:

- * Extremely short valve stroke permits unrestricted admission of air. Large bearing areas on valve plug minimize wear.
- * Large oil reservoir surrounds cylinder bushing; feeds oil automatically to all working parts.
- * Large size bearing on both sides of rille bar head insures proper alignment.
- * Blower valve and handle forged in one piece.
- * Steel puller easily disengaged by hand—yet cannot open accidentally.

GARDNER-DENVER

SINCE 1859

For complete information, write:
Gardner-Denver Company
Quincy, Illinois



FOR THE ELIMINATION OF STREAM POLLUTION OR RECOVERY OF MARKETABLE COAL

— — a General American Thickener or Hydroseparator and a Conkey Rotary Disc Vacuum Filter form an efficient team.

The General American Thickener or Hydroseparator is the most completely automatic and fool-proof machine now available. The special hydraulic lift makes a virtually "choke-proof" machine, permitting shut-downs without recirculation and starting under a full load. Where operation is such that surges of fine coal occur,

the thickener will handle them automatically. The thickener will never stall in the event of a power failure.

The Conkey Rotary Disc Vacuum Filter, with tangential segment discs, provides 23% more cake building time cycle with the same diameter discs as competitive filters.

A General American engineer will be glad to give you further details on the advantages of these machines.

GENERAL AMERICAN TRANSPORTATION CORPORATION

Process Equipment Division

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WORKS: Sharon, Pa., East Chicago, Ind.

OFFICES: Chicago, Cleveland, Louisville, Orlando, Pittsburgh, St. Louis, Salt Lake City, Sharon, Washington, D. C.





PROBLEM—To keep expensive Diesel Powered shovels, draglines, bulldozers and trucks on the job. To reduce or prevent costly engine breakdowns caused by "carbon," sludge or oxidation products.

SOLUTION—Cities Service Heavy Duty Diesel Engine Lubricants. They are made from the finest crudes, specially treated and chemically fortified to fight off these carbon deposits. By resisting oxidation they also resist the formation of acids corrosive to bearings.

TOP PERFORMANCE...

thru top quality lubricants



PROBLEM—To find an Effective Wire Rope and Gear Compound.

SOLUTION—The operating conditions involved in strip mining require lubricants able to protect open gears and wire rope against rust wear and breakage. Maintenance time and cable expense can be reduced with a tough gear and cable compound that doesn't require heating to apply. Cities Service Lubrication Engineers are proving this daily with Cisco Compounds #3-Z and 5-Z.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS



Cities Service Oil Company
Sixty Wall Tower, Room 221
New York City 5, N. Y.

FREE—Please send me without obligation your Diesel Engine Lubrication Booklet.

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Company Name _____

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Here's a Proved way to set High-Standards in Design

When you've been around for 30 years you're bound to earn some sort of reputation. That's happened to Norma-Hoffmann bearings, and, in thousands of blueprints it gets put down in "blue and white" like this: *Norma-Hoffmann or equal.*

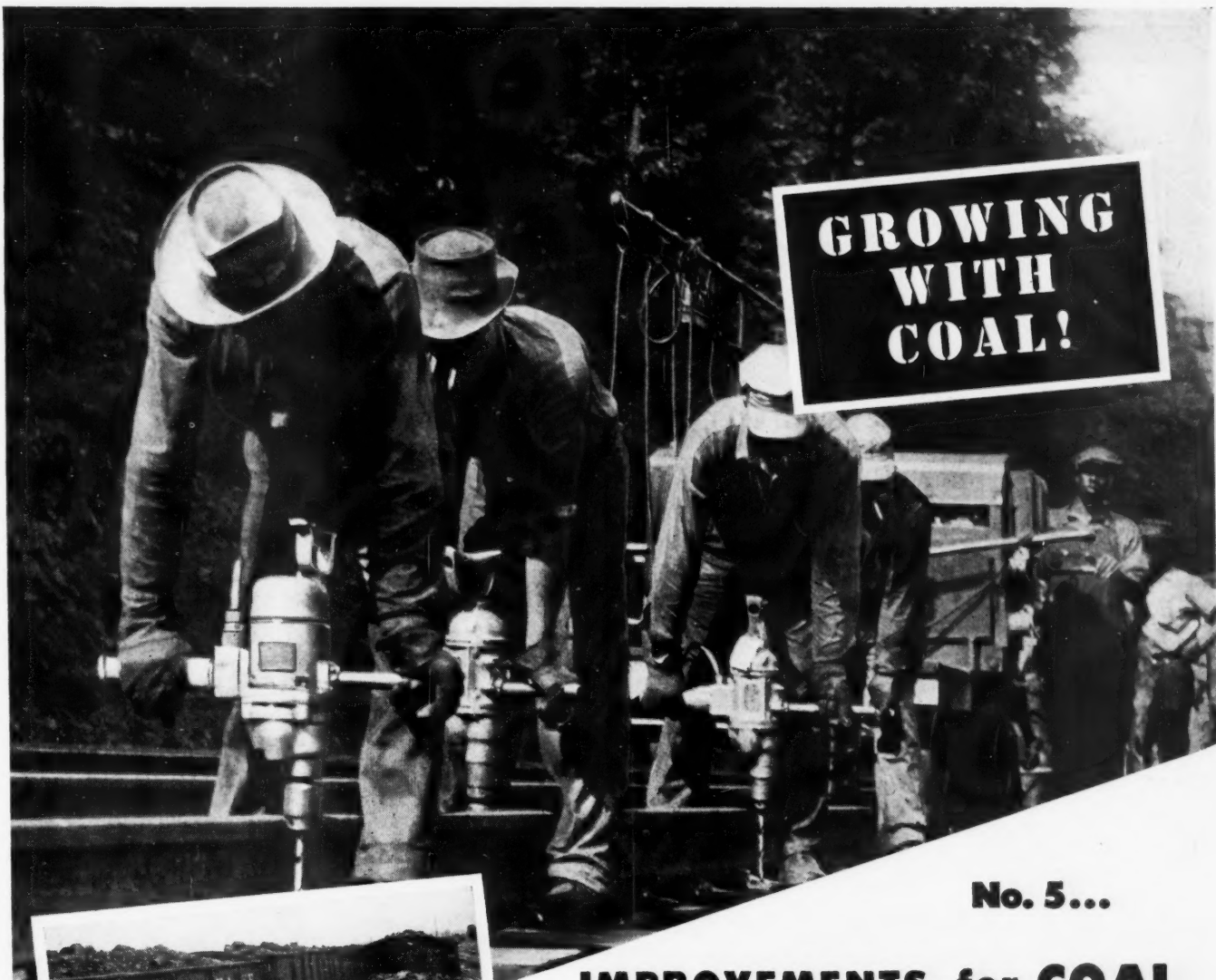
Designers tell us there are extra values in these bearings. That they can specify Norma-Hoffmann and right there a worry is off their minds.

We have certainly set up high enough standards to

assure delivering these extra qualities. There's no secret how. It's explained in one word: *precision.*



NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONNECTICUT • FIELD OFFICES: New York, Chicago, Cleveland, Detroit, Pittsburgh, Cincinnati, Los Angeles, San Francisco, Dallas, Seattle, Phoenix



No. 5...

IMPROVEMENTS-for COAL

The obvious first step a railroad must take in keeping pace with the growing coal industry, is the addition of new coal cars and new locomotives. Such additions necessarily entail innumerable improvements and expansion along the entire railroad. The items shown here comprise but a small portion of Chesapeake and Ohio's gigantic plan to keep "Growing with Coal".

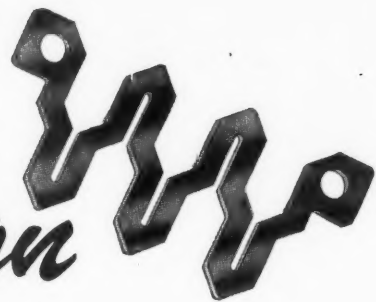
- 1,550 miles of track make up the principal assembly and classification yards on the Chesapeake and Ohio, with a total capacity for 107,200 cars.
- C & O's yard capacity has increased 9,800 cars in the last ten years—and is still growing.
- Eighty-seven miles of track have been added to C & O yards since 1937, and this expansion is continuing at the present time.
- 529 track miles of CTC service (Centralized Traffic Control) have been installed on C & O during the past ten years, increasing coal carrying capacity and speeding coal movement.
- New installations of automatic car retarders, radio-telephones, and other modernized equipment, coordinated with grade and curve reduction, increased round-house and maintenance facilities, extension into new coal areas—all illustrate how Chesapeake and Ohio is keeping pace with the growing coal industry.



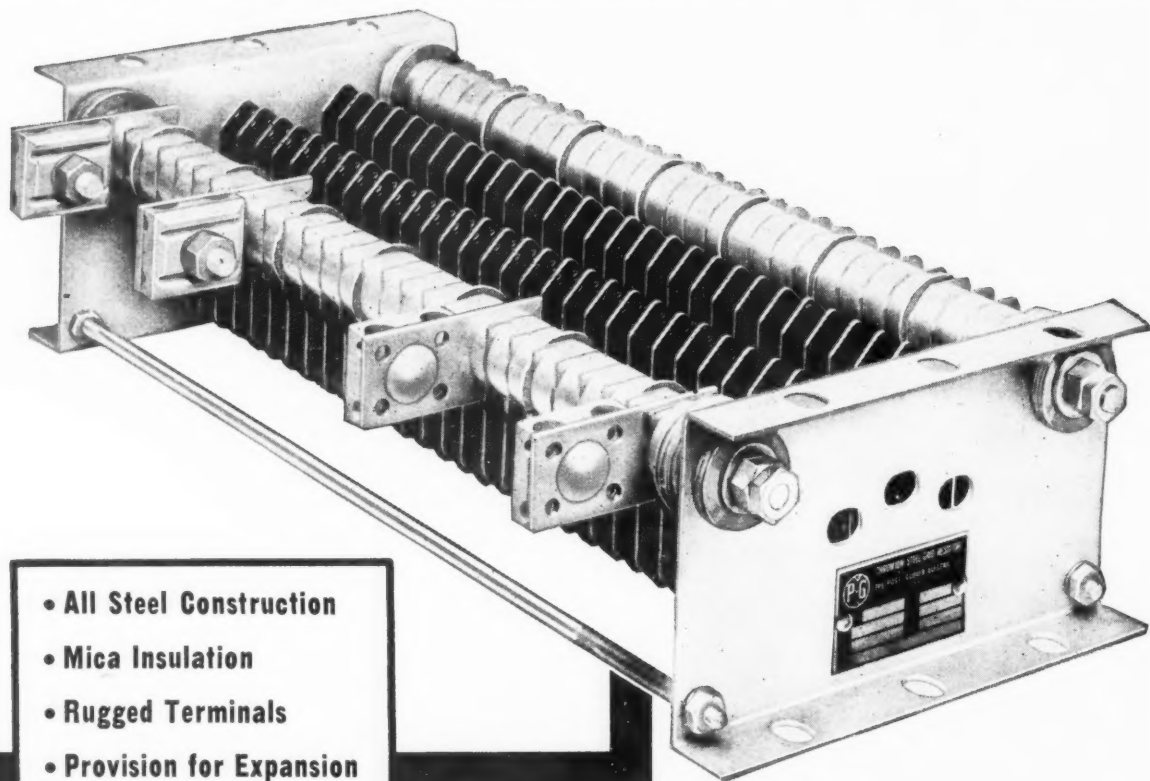
CHESAPEAKE & OHIO RAILWAY

Largest Originating Carrier of Bituminous Coal in the World

A Grid Design



TO ELIMINATE HOT SPOTS...
and **INSURE EVEN HEAT DISTRIBUTION!**



- All Steel Construction
- Mica Insulation
- Rugged Terminals
- Provision for Expansion
- Adequate Ventilation
- Unaffected by Vibration or Moisture
- Corrosion Resistant

The unique shape of P-G Resistor Grids permits unusually even heat distribution over the entire grid surface. Since each part of the resistor element has relatively equal exposure to the air, heat is rapidly dissipated and hot spots fail to develop. For trouble-free, heavy-duty service, you can safely specify P-G.



The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

National **HOMES** **for INDUSTRIAL HOUSING . . .**

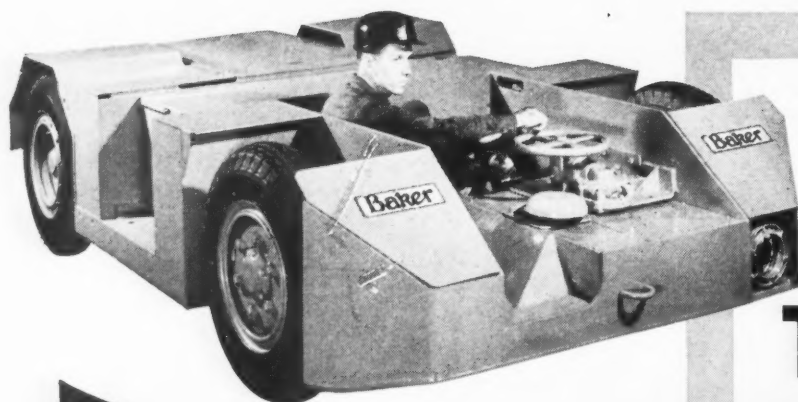
PRICE RANGE
from \$3,000 up

● Place your housing problem in the hands of National Homes Corporation for the solution you want — an immediate one assuring long-term satisfaction. We erect houses on any location in any number for families of varying earning power. Optional features (such as porches, garages, type of heating, extent of plumbing and wiring, etc.) make houses available in price ranges you can afford. NATIONAL HOMES provide comfort and convenience at least expense. Our field construction crew, trained in efficiency, erects the houses complete and ready for occupancy.

NATIONAL HOMES CORPORATION
LAFAYETTE, INDIANA, U. S. A.



● Write us for literature giving complete details on National Homes Industrial Housing. Over 13,000 National Homes Now In Use.



BAKER MINE TRACTOR

Solves Low-Seam Trackless Hauling

**Pneumatic-tired, battery powered . . .
operates in seams as low as 30 inches**

Baker battery-powered mine tractors are not restricted to any path, and can haul trailers over any cleared area or in seams where headroom is 30 inches or more. Drive wheels have dual tires and front axle is center pivoted giving full traction over rugged ground. Dual wheels enable tractor to span ruts and decrease ground pressure permitting operation on wet bottom. Ideal for hauling supplies from yards to face, transporting mine personnel, moving face equipment between sections, hauling coal in drop-bottom trailers—or any job which requires flexible, mobile power—either as tractor alone or as tractor-trailer unit.

NEW- BAKER "TRIKE"

Permissible Supervisor Car for Mines

Three wheel, light, maneuverable battery-powered car designed for transporting supervisors, mechanics, fire-bosses, engineers, etc., in low seams. Operates successfully in wet fireclay bottom, rolling seams and close timbering. Will carry 500 lbs. Overall dimensions 36" wide with 6" ground clearance and 22" overall height with man in prone position. Alternate model is 48" wide for accommodating two men. Designed to Bureau of Mines Specifications, and carries a permissible plate.

Manufactured by
THE BAKER-RAULANG CO.
2155 West 25th Street • • • Cleveland, Ohio

Specifications

WEIGHT—4½ tons with battery.

CAPACITY—Develops 3000 lb. maximum starting drawbar pull under dry, hard bottom conditions. Will draw a 10-ton trailing load on anti-friction wheel bearings.

POWER UNIT—48-volt battery with ample capacity for full shift plus generous reserve. An automatic charger on the mine power supply recharges battery in 8 hours, permitting three-shift operation with one spare.

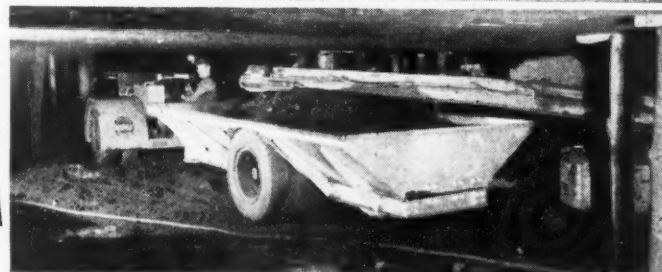
MOTOR DRIVE—Direct connected 48-volt motor drives rear wheels through differential and worm with a secondary spur-gear reduction. Four-speed full contactor control gives 3 to 4 MPH.

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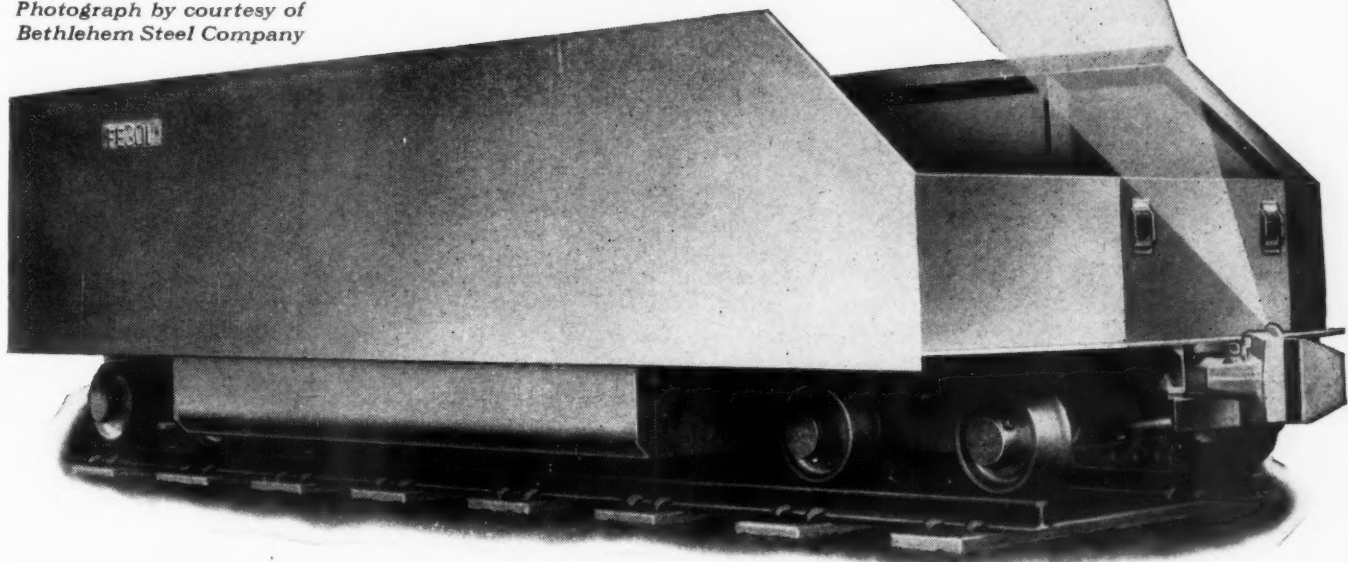
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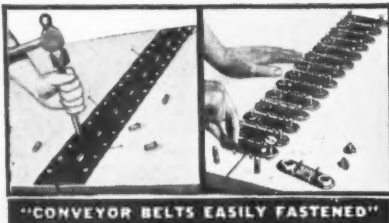
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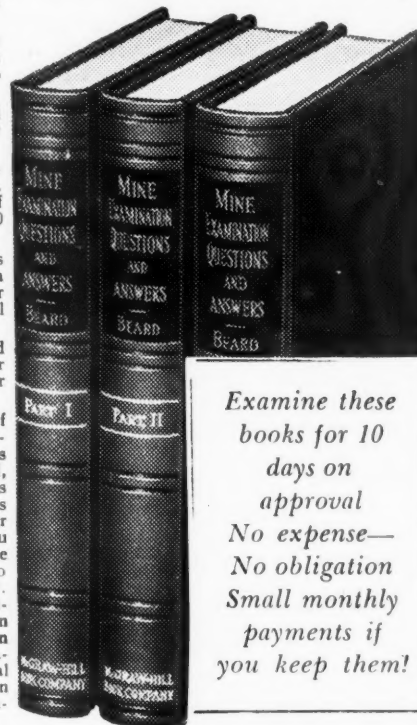
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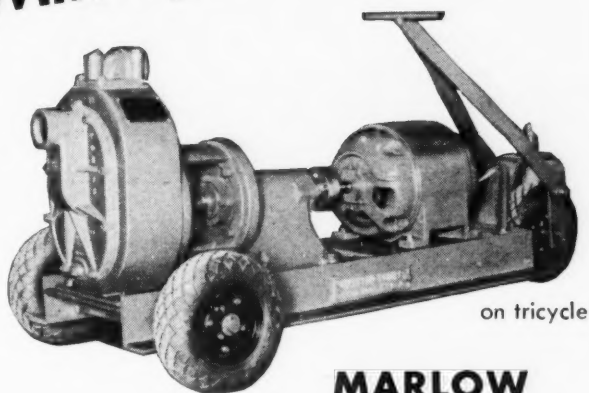
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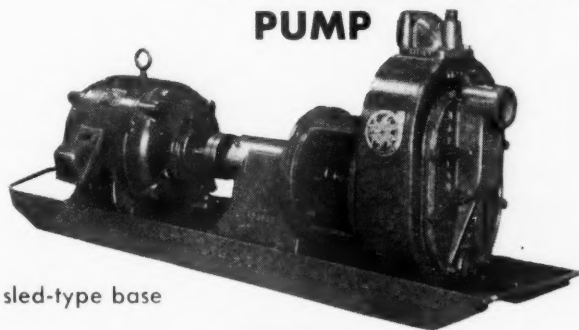
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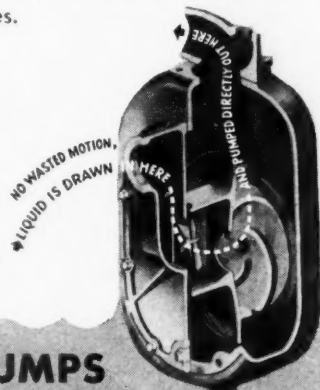
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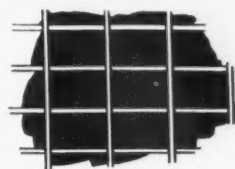
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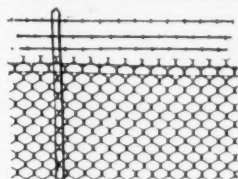
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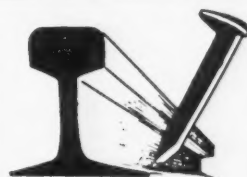
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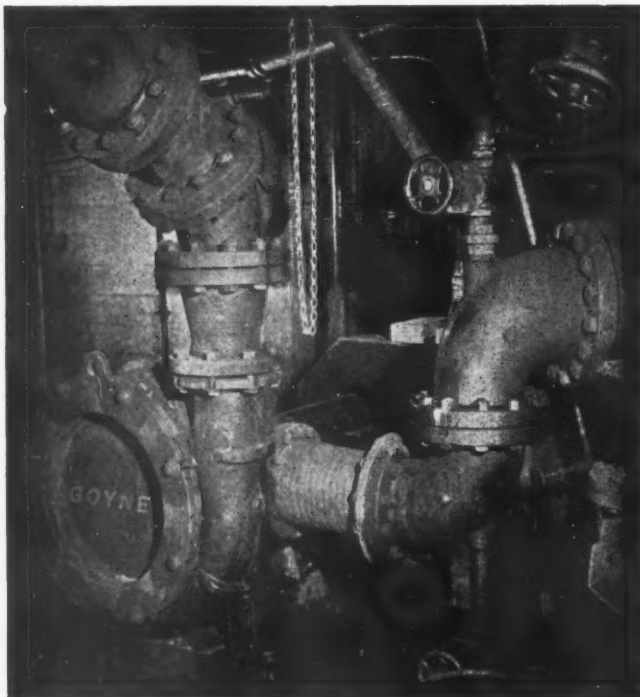
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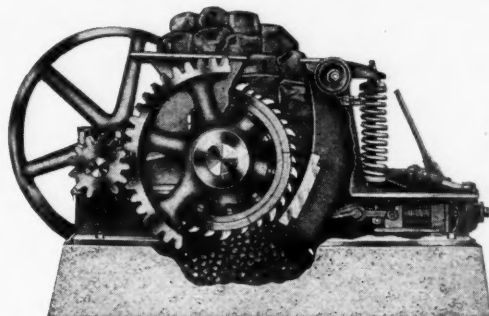
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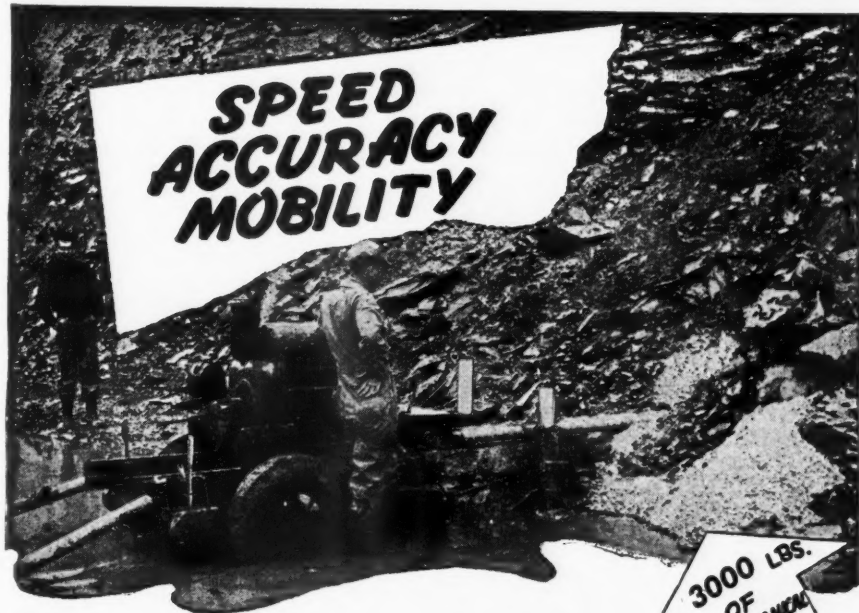
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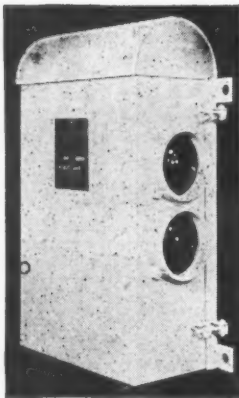
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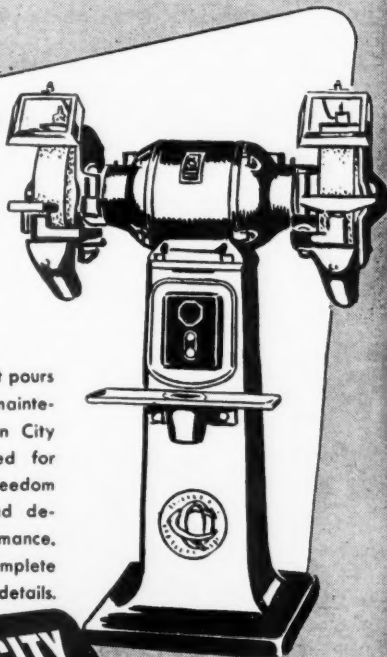
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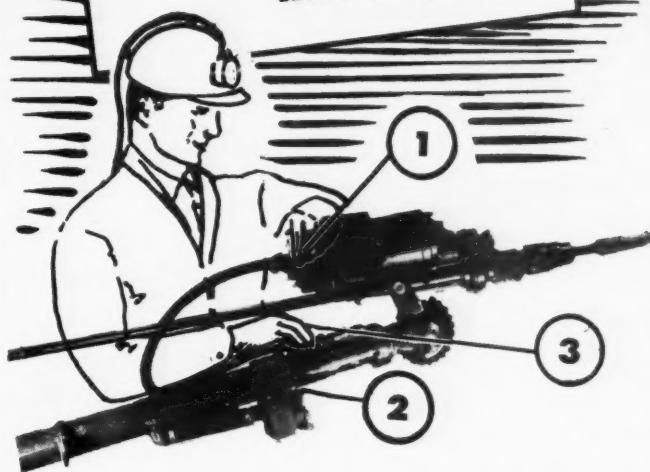


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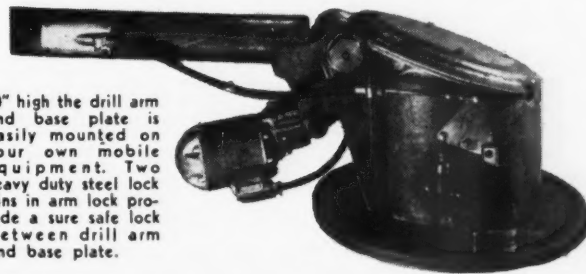
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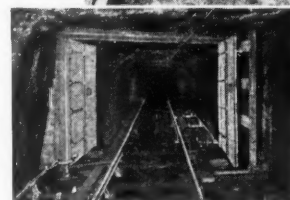
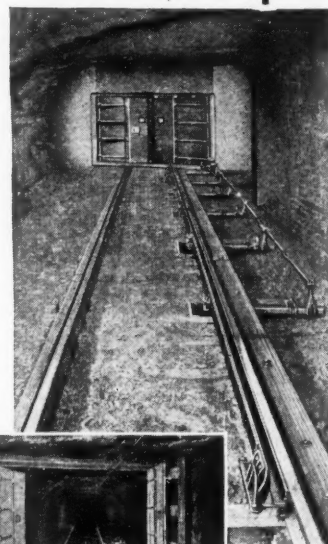
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POSITIONS WANTED (full or part-time individual salaried employment only), 1/2 the above rates.
PROPOSALS, 90 cents a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE

The advertising rate is \$7.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured 7/8 inch vertically on one column, 3 columns—30 inches—to a page. C.A.

NEW ADVERTISEMENTS received by 10 A.M. October 21st will appear in the November issue subject to limitations of space available

SALESMAN to handle Blasting Magnetos

New, 10-shot type, certified permissible by U. S. Bureau of Mines. Automatic switch at peak voltage. Pocket size. Hundreds now in use. Good territories still open. Excellent commission proposition.

SW 6577, COAL AGE,
330 W. 42nd St., New York 18, N. Y.

REPLIES (Box No.):

Address to office nearest you.

NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

MINE TRANSITMAN wanted. Permanent. Give full particulars and salary wanted first letter. P. O. Box 125, Pineville, Ky.

POSITIONS WANTED

ACCOUNTANT TAKE charge—45 years of age, taxes, financial statement, systems, costs, etc., prefer medium sized coal corporation. PW 6566, Coal Age.

REGISTERED PROFESSIONAL Engineer licensed in West Virginia, Ohio and Pennsylvania desires connection with established consulting firm of engineers. He is experienced in mine management and engineering including layout, design, construction and modernization. Has specialized in cost accounting and control, budgeting for costs and capital expenditures; operations analyses; mine examinations; wage incentive plans developed; and personnel and safety analyses made. Would consider making investment. PW 6541, Coal Age.

POSITION WANTED as Superintendent or Manager in charge of mine operations. Good reason for wanting to change; good record and references will be offered. Available for interview. PW 6542, Coal Age.

WANTED

ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

COAL LANDS

Suitable for strip mining. Complete details upon request.

G. B. LORRAINE

Law Building Richmond 19, Va.

FOR SALE

Various types and kinds of coal mining equipment; also 6 coal mines, complete; 3 of these mines are in operation; have equipment of all kinds for small and large mines—write for information.

Lawrence Boutwell, General Manager

B & W COAL COMPANY

Phone Shawneetown 2723 Junction, Illinois

WANTED

—TRANSFORMERS—



TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign All Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"

Station M Since 1912 CINCINNATI 27, OHIO

WANTED BRIQUETTING PLANT

New or used, in operating condition, one briquetting plant, for manufacture of anthracite briquettes, complete with heater or boiler plant, pitch cracker and elevator, coal elevator mixer, disintegrator, ovoid or pillow type briquetting machine and disposal conveyor, together with necessary shafting and drive motors for 440 volts, 60 cycles, 3 phase.

Plant capacity desired: 20 tons per hour minimum—60 tons per hour maximum.

E. A. GODOY & CO., INC.

25 BROADWAY, NEW YORK 4, N. Y.

WANTED AIR COMPRESSORS

2—1,000 FT. TO 2,600 FT. CAP.

ADVISE WHERE INSPECT & DETAILS

DARIEN CORP., DARIEN, CONN.

Buying

Good Used Equipment

is frequently the difference between having good needed equipment or doing without it.

WANTED

3/4 to 5 yard Shovels
2 to 10 yard Draglines

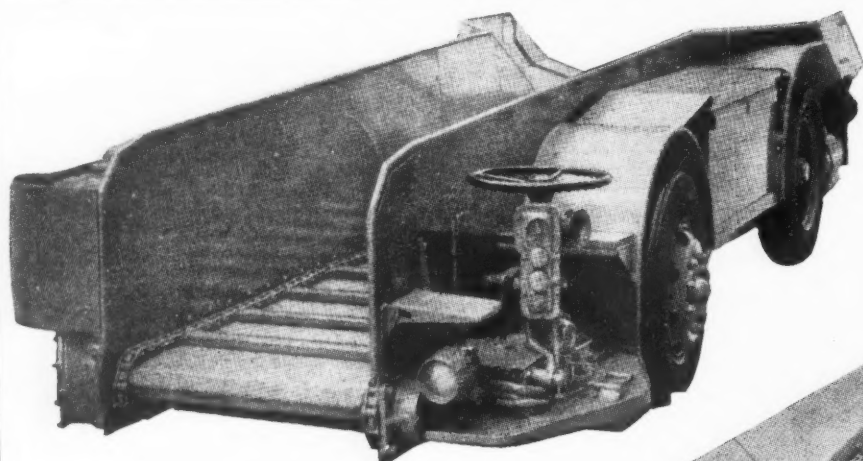
Tractors and Dozers

Frank Swabb Equipment Co., Inc.

Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910J

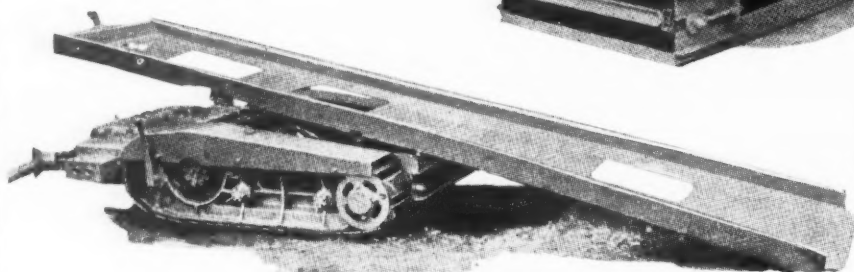
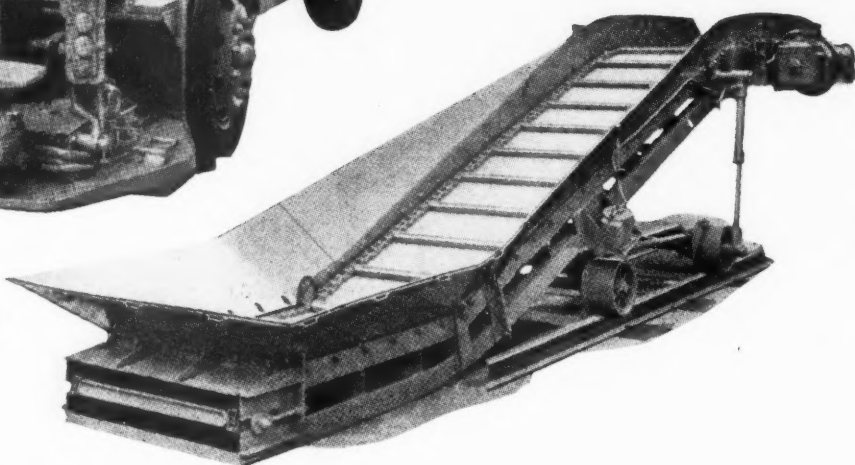
COMPLETE LIQUIDATION IMMEDIATE DELIVERY

... *New and nearly new
coal mining machinery
and equipment*

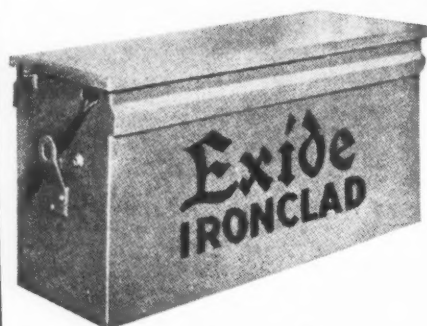


LEFT:
JOY 42-D
SHUTTLE CAR

RIGHT:
JOY
SHUTTLE CAR
WITH ELEVATING
CONVEYOR

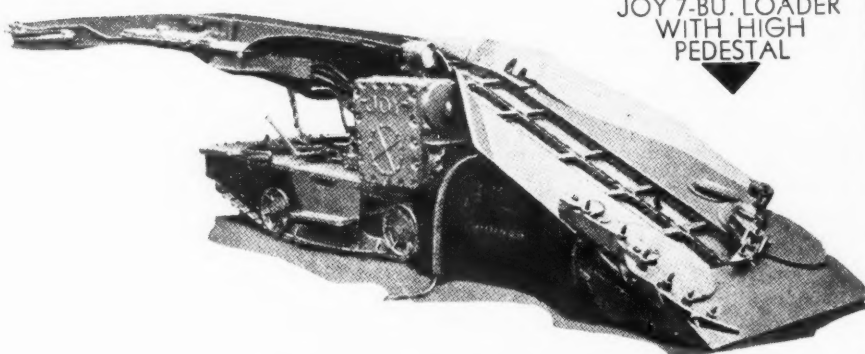


LEFT:
JOY "T-1"
MINING MACHINE
TRUCK



EXIDE AND GOULD
IRONCLAD BATTERIES

BELOW:
JOY 7-BU. LOADER
WITH HIGH
PEDESTAL



THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY

DENVER 2, COLORADO

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

THE COLUMBINE MINE EQUIPMENT CO., INC.

*... New and nearly new
coal mining machinery
and equipment*

1669 BROADWAY, DENVER 2, COLORADO

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

Complete Liquidation . . . Immediate Delivery

Here are some of the HARD-TO-GET OFFERINGS

(While They Last)

1—10 ton Jeffrey locomotive 36" ga. (trolley type), 250 v. D.C.
3 ton, 4 ton, 5 ton, 8 ton, 10 ton, 15 ton, and 20 ton G. E., Westinghouse, Jeffrey and Goodman locomotives.

COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.
Goodman Shortwall No. 112 mining machines.
Goodman 36" gauge TRUCKS, Type "M."

MINING MACHINE TRUCKS—Joy "T.I."

MOTOR GENERATOR SETS—I set 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. I set 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.

BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros. Co., Electric Products Co.

MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.

TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.

BOX CAR LOADERS—Ottumwa-Manerre.

PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming, and Myers.

FANS—American Blower, Sturdevant.

TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.

VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.

SHAKER SCREENS—"Marcus" shaker screens.

CONVEYORS—Flight conveyors, elevator conveyors.

COAL CRUSHERS.

RAILS—150 tons 60 lb., 150 tons 65 lb.

SPIKES, bolts, tie plates, frogs, switches, switch throws.

COPPER trolley wire—2/0, figure 8 and 4.0 round.

TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.

TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2/0 to 500,000 CM. New.

JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.

SHUTTLE CARS—Joy 42D storage battery.

ELEVATOR CONVEYORS—Joy.

AIR COMPRESSORS.

MACHINE SHOP—Complete.

ELECTRIC SHOP—Complete.

CARDOX PLANT—Complete.

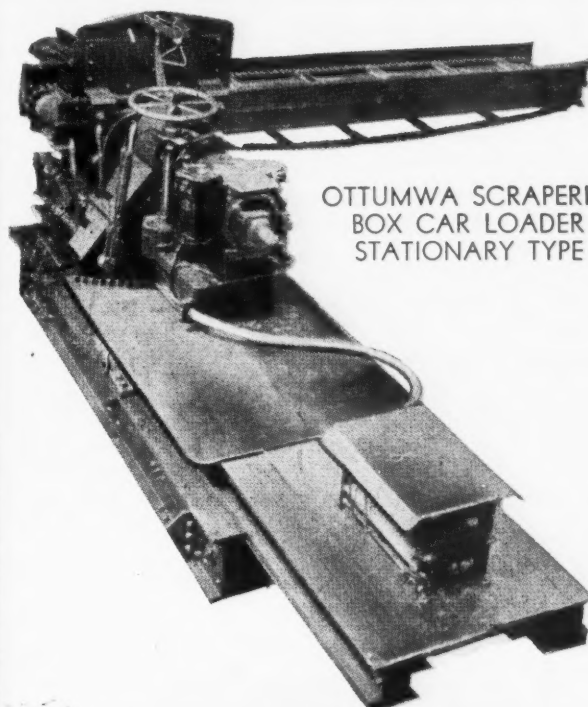
BATTERIES—Exide and Gould Ironclad, 24 cells.

\$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

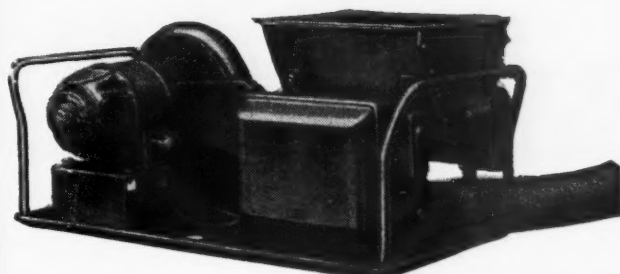
ROTARY CAR DUMPER for 36" gauge Cars With Automatic Control.

HOISTS—I Double Drum Conical Hoist—Denver Engineering Works—300 HP., Silent Chain Drive, Complete With All Panelboards, Transformers and Controllers and Numerous Others.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION



OTTUMWA SCRAPERLINE
BOX CAR LOADER
STATIONARY TYPE



MINE SAFETY APPLIANCE CO.
ROCK DUSTER



GOODMAN TYPE 112
SHORTWALL COAL CUTTER

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

SEARCHLIGHT SECTION

SHOVELS - DRAGLINES - DRILLS - TRACTORS

Model 500-W Bucyrus-Erie Electric Dragline. 165' boom, 12 yd. bucket.

Model 7-W Bucyrus-Erie Diesel Dragline. 185' boom, 5 yd. bucket.

Model 6160 Bucyrus-Monigham Diesel Dragline. 160' boom, 8 yd. bucket. Machine completely rebuilt.

Model 625-S Page Diesel Dragline. 150' boom, 8 yd. bucket. Recent machine.

Model 621-S Page Diesel Dragline. 135' boom, 6 yd. bucket. Excellent condition. Bargain.

Model 618 Page Diesel Dragline. 110' boom, 5 yd. bucket. Fine condition.

1400 P&H Electric Shovel, 32' boom, 21' stick, 4 yd. dipper. Magnatorque hoist. Machine new in 1948.

111-M Marion 3 1/2 yd. Standard Shovel 2 G.M.C. diesel engines. Less than 1 year old.

1201 Lima High Lift Shovel. 42' boom, 32' stick, 2 1/2 yd. dipper, Cummins diesel engine.

955 P&H 2 1/2 yd. Diesel Shovel. In fine condition.

K-595 Link-Belt Dragline. 85' boom, 2 1/2 yd. bucket, D17000 Caterpillar diesel engine.

93-M 2 1/2 yd. Marion Diesel Shovel. 1 year old.

54-B Bucyrus-Erie High Lift Shovel. 45' boom, 32' stick, 2 yd. dipper, Buda diesel engine. 1948 machine.

802 Lima High Lift Shovel. Air controlled; 34' 6" boom, 27' stick, 1 3/4 yd. dipper with 70' dragline boom and fairlead; D17000 Caterpillar diesel engine. Excellent condition.

Lorain 79 Air Controlled High Lift Shovel. 23' 6" boom, 23' stick, 1 3/4 yd. dipper.

37-B Bucyrus-Erie 1 1/2 yd. Shovel. D13000 Caterpillar engine. Excellent condition.

Model 1007 Osgood Dragline. 80' boom, 2 1/2 yd. bucket, D17000 Caterpillar diesel engine, Kohler light plant. Less than 1 year old.

Model 6 Northwest 1 1/2 yd. Shovel. Murphy diesel engine. New in 1946. In excellent condition.

Model 44 Loomis Clipper Blast Hole Drills. Full crawlers. Tools for 6" holes.

42-T Bucyrus-Erie Blast Hole Drill with Caterpillar diesel engine; tools for 9" holes.

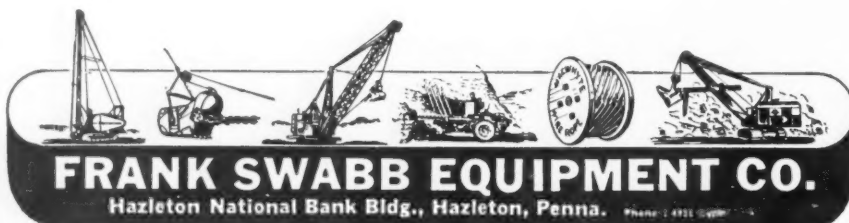
D-4 Caterpillar Tractors with bulldozer blade. Unused.

D-7 and D-8 Caterpillar Tractors and Bulldozers. Rebuilt.

TD-9 International Caterpillar Tractor with Hydraulic angledozer blade.

1201 Lima Standard Shovel Front—32' boom, 22' stick, 3 yd. Amsco dipper.

We carry in stock Page Automatic Dragline Buckets. We may have the size you need for immediate delivery.



Telephone 4910

HIGH GRADE TOOLS

14x18x72 Galmeyer Livingston Surface Grinder.
18"x8" American Screw Cut. Engine Lathe.
±500 U K Hanchett Face Grinder.
±104-2 Rivett Internal Grinder.
42x42x20 Cincinnati Planer.
6" Pratt & Whitney Vert. Shaper.
±2B Simmons Micro Speed Turret Lathe.
24", 36" & 42" Bullard Vertical Turret Lathe.
±33 Lucas Horizontal Boring Mill.
20"x12" Boye & Emmes Lathe.
24"x16" American Geared Head Lathe.
2' to 7' Plain Radial Drills.
16" and 24" G & E Shapers.
New No. 3-4-5 Davis Keyseating Machine.
Also various other machine tools.

Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second St. Cincinnati 2, Ohio

WESTINGHOUSE

TYPE SK—MOTORS

WIRE INQUIRIES COLLECT

MOTORS, GENERATORS, TRANSFORMERS



1 — 1500 H.P.
Bought and Sold
New and Rebuilt

ELECTRIC EQUIPMENT CO.
Rochester 1, N.Y.

PIPE — MACHINERY — GAS ENGINES AIR COMPRESSORS — DIESELS — PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY

WAYNE, WOOD COUNTY, OHIO

Near Toledo



M-G SETS—AC to DC
500 KW G.E. DC 250 V., synch. motor, 2300 V.
150 KW Cr. Wh. DC 250 V., synch. motor 440 V.
100 KW Whse. rotary converter, 250 V. DC output.
80 KW Star DC 250 V., synch. motor 440 V.

D.C. MOTORS—230/250 V.
150 HP Cr. Wh. b.b. TEFC 890 RPM.
160 HP Whse. SK 181 450/900 RPM.
80 HP G. E. CDM 1,800 RPM, b.b. drip (2).
75 HP Allis-Ch. E. 500 RPM, auto starter.
60 HP Whse. SK 1700 RPM.
60 HP Allis-Ch. b.b. 520/890 RPM, New.
50 HP G.E. CD 123 850 RPM.
40 HP Whse. SK110L 1700 RPM.
40 HP Whse. SK133 850 RPM.
30 HP Whse. SK 160 350/1050 RPM.
25 HP Whse. SK 1100 RPM.
15 HP Whse. SK 850 RPM. (5).

Complete Stock A.C. Motors—New and Rebuilt Up to 500 H.P.—Sq. Cage, Slip Ring, Synch.

SPECIAL—600 H.P. G.E. slipping motor 300 RPM, 3/60/440 V.

Gear Head Motors Speed Reducers Pumps—Blowers
WRITE — WIRE — PHONE

ARTHUR WAGNER CO.
1433 W. Randolph St. Chicago 7
ELECTRIC MOTORS · GENERATORS

IMMEDIATE SHIPMENT AT REDUCED PRICES

Conveyor for mines and
tipples priced from.....\$ 665.00
Picking table, with motor
and 48" belt..... 1,100.00
Stoker Coal crusher..... 474.00
Large coal crusher..... 1,074.00
15-ton truck scale..... 450.00
20-ton truck scale..... 510.00
33-ton truck scale, 34'
platform 1,650.00
5-ton tipple scale..... 312.00
Vibrating screens, 2' to 5'
wide, many lengths, 1 to 5
decks. All with screen cloth
or plates to customers'
specifications. Priced from 648.00

BONDED SCALE & MACHINE COMPANY
2190 S. Third St., Columbus 7, Ohio
Phone Garfield 2186 University 2832 Evenings

AIR COMPRESSORS

2—175 CFM Inger. Rand 2 cyl. vert. 150 P.S.I.
Type XIV dir. con. to G.E. 50 HP DC motor,
230 V. 400 RPM. Mounted on factory cast iron
base. Complete with inter-cooler, unloader and
access.

PHILADELPHIA TRANSFORMER CO.
Box 566 Dalton, Pa.

ORTON LOCOMOTIVE CRANE

20 ton capacity, oil fired, in good operating condition. Can be seen in use daily.

MULLINS LUMBER COMPANY
Mullins, S. C.

IRON and STEEL PIPE

New and Used
Large stocks, all sizes
attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 Pittsburgh 30, Pa.



B A R G A I N S IN THOROUGHLY RECONDITIONED EQUIPMENT

COAL CRUSHERS

- 1—26" American Ring Type.
- 1—24 x 20 Jeffrey Swing-Hammer Mill.

BELT CONVEYORS

- 2—24" 15 to 75' Long, with Ding's Pulley.
- 1—24" 30' Long, with 5 H.P. Gearhead Motor.
- 1—28" 30' Long, with 2 H.P. Gearhead Motor.
- 1—30" 70' Long, with driving mechanism.
- 1—36" 50' Long, with driving mechanism.

MAGNETIC PULLEYS

- 1—24" Dia. x 26" Face Stainless Steel Ding's, 5'6" Centers, complete with mechanism, charger and 1 H.P. Gen. Elec. Gear Motor.

VIBRATING SCREENS

- 1—3' x 6' Single Surface Tyler-Niagara, V-belted to 5 H.P. A.C. Motor.
- 1—3' x 6' Single Deck Plat-O, Flat belt drive to 2 H.P. A.C. Motor.

MOTORS—AC

- 1— $\frac{1}{8}$ H.P. New Leland Single Phase Motor.
- 4— $\frac{1}{2}$ H.P. New Leland Single Phase Motors.
- 2—1 $\frac{1}{2}$ H.P. New Leland Single Phase Motors.
- 2—2 H.P. New Louis Allis 3 Phase Motors.
- 1—3 H.P. New Leland 3 Phase Motor.
- 1—5 H.P. New Leland 3 Phase Motor.
- 2—1 $\frac{1}{2}$ H.P. Used G.E. 3 Phase Motors.
- 1—2 H.P. Used Wagner 3 Phase Motor.
- 9—5 H.P. Used G.E. 3 Phase Motors.
- 3—10 H.P. Used G.E. & West. 3 Phase Motors.
- 1—20 H.P. Used West. 3 Phase Motor.
- 2—25 H.P. Used G.E. 3 Phase Motors.
- 2—30 H.P. Used G.E. 3 Phase Motors.
- 3—35 H.P. Used G.E. 3 Phase Motors.
- 1—40 H.P. Used Allis-Chalmers 3 Phase Motor.
- 1—50 H.P. Used G.E. 3 Phase Motor.
- 1—75 H.P. Used G.E. 2200 volt, 3 Phase Motor.

AIR COMPRESSORS

- 1—8 $\frac{3}{4}$ x 4 $\frac{3}{4}$ x 5 Chicago Pneumatic, 277 Cu. Ft. Displacement. V-belted to a D-4400 Caterpillar Diesel Engine—Semi-portable.

HOISTS

- 1—No. 22 Vulcan, with Man Cage, 30' Steel Headframe and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake. (Hoist purchased new in 1942).
- 1—Single Drum Gasoline Hoist, direct connected to 25 $\frac{1}{2}$ x 4 $\frac{1}{4}$ Wisc. Gas. Engine.
- 1—15 H.P. Single Drum Hoist, direct geared to motor with controller and grids.

TRACTORS

- 2—Diesel Caterpillar 50 Tractors, with 10' Angle Dozers.

COAL WASHING EQUIPMENT

- 2—Rheolaveur Launderers, complete with Steel Supporting Frame.
- 1—60" Dia. Dividing Table, direct connected to 2 H.P. D.C. Motor.
- 1—Galigher Auto. Sampler with adjustable stroke and direct connected to a 1/6 H.P. Motor.
- 1—12' x 10' Steel Hopper Bin.

- 1—70' x 12' Dorr Thickener Tank, complete with mechanism.

RAILS

- 50 Tons—65# Relaying Rail.
- 15 Tons—40# Relaying Rail.
- 15 Tons—60# Relaying Rail.
- Plate Frog Switches—30# to 60#.

LARRY CARS

- 4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

GENERATORS—DIESEL

- 4—D-13000 Caterpillar Diesel Generators, 75 KW, 440 Volts, A.C.

WAGON DRILLS

- 1—Ingersoll Rand, with drifter, all on pneumatic tires, used about 6 months.
- 1—Sullivan #LW-6, with drifter, on steel wheels.

STEEL TANKS

- 1—8'6" x 29'8" Steel Tank (Army Bolted Type) Open Top, Cap. 44,000 Gals.
- 1—6' x 18' Steel Horizontal Closed Tank.

SLUSHER HOISTS

- 1—Ingersoll Rand, 3 Drum, with direct connected 50 H.P. A.C. Motor, and 2—1 $\frac{1}{2}$ Yd. Crescent Scrapers, unit used about 60 days.

COAL CUTTERS

- 4—Sullivan CE-7 A.C. Short Wall, Complete with Standard and Tip-turn Trucks, most machines with Power Cable.

New Cutting Machine Parts.

MINE FANS

- 1—8-H60 Jeffrey Aerodyne Exhausting Fan, with 75 H.P. Motor—Purchased new in 1942.

TROLLEY LOCOMOTIVES

- 2—7 $\frac{1}{2}$ Ton Goodmans, 36" Gauge, 250 Volt D.C.

PIT CARS

- 160 Card Iron Works R.B. Pit Cars, 36" Ga.
- 1 Card Iron Works Rock Car, 90 Cu. Ft. Capacity.

MISCELLANEOUS EQUIPMENT

- 1—Nock & Garside Continuous Push-button Elec. Freight Elevator, with 25 H.P. A.C. Motor, Counter weights, etc.
- 2/0 & 4/0 Standard RC Copper Wire.
- Fire Extinguishers.
- Electric Mine Gongs.
- 1—Manierre Type Box Car Egg Loader, 18" x 12' Long belt & 5 H.P. A.C. Motor.
- 1—8' x 28' Double Deck Shaker Screen.
- Wooden Wall Phones.
- Wire Rope, $\frac{3}{8}$ " to 1 $\frac{1}{4}$ ".
- 6—200 Gal. Galv. Steel Oil Tanks.
- 1—Jarecki Pipe Threader, $\frac{1}{2}$ " to 2", B.D.
- 1—Merriman Bolt Threader, $\frac{3}{8}$ " to 1 $\frac{3}{8}$ ", B.D.
- 4—Steel Mine Cages.
- 3—37 $\frac{1}{2}$ KVA Pittsburgh Transformers 440/110/220.
- 1—25 KW Crocker-Wheeler D.C. Generator with switch-board.
- Chain Blocks, 1 $\frac{1}{2}$ Ton to 2 Ton.

Write for Our Bulletin No. 9 and Utah List

FLORENCE
MACHINERY AND SUPPLY COMPANY
SUITE 904, EQUITABLE BUILDING DENVER 2, COLORADO

C. J. PARRISH, MGR.

Phone: Alpine 2803

Yards: Denver and Florence, Colorado

SEARCHLIGHT SECTION

250-VOLT BALL-BEARING LOCOMOTIVES

- 3—6-ton General Electric, Type HM-821.
 - 5—6-ton General Electric, Type HM-801.
 - 4—6-ton Westinghouse, Type 905-C.
 - 3—8-ton General Electric, Type HM-822.
 - 4—8-ton Goodman, Type 32-A-1-4-T.
 - 3—8-ton General Electric, Type HM-819.
 - 2—8-ton General Electric, Type HM-707.
 - 4—8-ton General Electric, Type HM-839.
- The above Locomotives are from 36" to 48" gauge. All are equipped with CY-21 motor-driven gathering reels and 500' of practically new cable. All are rebuilt. Can make immediate shipment.

AC CUTTING MACHINES

- 4—Jeffrey 35-BB, 3 phase, 60 cycle, 220/440 volt, on self propelled trucks, reel and cable.
- 5—Goodman 112-CG-3A, 3 phase, 60 cycle, 220/440 volt, on self-propelled trucks, reel and cable, 7 1/2' cutter bar.
- 5—Goodman Universal, 112-G3, 3 phase, 60 cycle, 220/440 volt, on self-propelled trucks.

LATE TYPE GATHERING REELS

- 5—Practically new General Electric motor-driven Gathering Reels, Type MVR-42-F5, Reel Motor Type 301-E2 with 500' of practically new cable.
- 3—CY-21 motor-driven Reels with 500' of cable.

DC CUTTING MACHINES

- 5—Sullivan 11-B Shortwall Mining Machines.
- 5—Jeffrey 35-B Machines, just taken out of service.
- 1—Practically new Jeffrey 29-U Universal Track Cutter, Serial No. 25933.
- 3—New Jeffrey 29-L Low Vein Type Track Cutters, 30' tramming height, 8' cutter bar, 9' adjustment of cutter bar, 4 3/4' adjustment of adjusting screw; will cut 6" below rail.

LOADING MACHINES

- 1—L-500-B Jeffrey Loading Machine, Serial No. 23255, 250 volt DC.
- 4—12-BU Joy Loading Machines, 250 vol, all purchased new in 1944, used very little.

- 2—8-BU Joy Loading Machines, 250 volt DC.
- 5—7-BU Joy Loading Machines, 220/440 volt AC.
- 3—8-BU Joy Loading Machines on cats., 42" gauge, 220/440 volt AC.
- 6—7-BU Joy Loading Machines on cats., 42" gauge, 220/440 volt AC.

600-END-DUMP 3 1/2-TON STEEL MINE CARS

- Height overall—46".
- Length of body—9'.
- Overall length—10'2".
- 18" Timken roller bearing wheels.
- Wheel base—36".
- Width—64".
- Axles—3".

- Steel bodies—3/16".
- Drawbar—1" x 4".
- Oak bottoms—3/4".
- 3—Link couplings.
- 3—Binders.
- Spring draw head one end.
- Track gauge—42".

400-ROTARY-DUMP 5-TON ALL-STEEL MINE CARS

- Height overall—54" above rail.
 - Length over bumpers—12'1/2".
 - Inside length—10'2 1/2".
 - Width outside—69".
 - Coupling center—17 3/4" above rail.
- We have the rotary dump used with these Cars. They can be changed to end-dump or height can be easily cut down 6" or 8".

MISCELLANEOUS

- 13—Jeffrey 61 A.M. Conveyors, complete in every respect.
- 4000'—30" Belt complete with LaDel Belt Tails, Idler, and all necessary appurtenances.
- 4750'—26" LaDel Belt with all necessary idlers and appurtenances.
- 1—4-Track Tipple including two loading booms, vibrating screens and two jigs, capable of washing 50 tons per hour.
- 5—Drum Sullivan Drag Hoists, HDE 25, complete; two with 50 HP Motors; three with 25 HP Motors.

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES COMPANY

306-307 BEASLEY BUILDING L.D. PHONE 34 TERRE HAUTE, INDIANA



Frank J. Wolfe

MOTOR GENERATORS

- 500 KW G.E. SYN. 275 V. 2300/4000 V. 3 PH. 60 CY. 900 RPM. SWITCHGEAR.
- 500 KW G.E. SYN. 575 V. 2300/4000 V. 3 PH. 60 CY. 900 RPM. SWITCHGEAR.
- 400 KW G.E. SYN. 275 V. 2300/4000 V. 3 PH. 60 CY. 900 RPM. SWITCHGEAR.
- 400 KW WEST. SYN. 575 V. 2300/4000 V. 3 PH. 60 CY. 720 RPM. SWITCHGEAR.
- 300 KW G.E. SYN. 275 V. 2300/4000 V. 3 PH. 60 CY. 1200 RPM. SWITCHGEAR.

SYNCH. CONVERTER

- 300 KW G.E. 575 V. 6 PH. 60 CY. 1200 RPM. Pedestal Type. 2300/4000 V. TRANSFORMERS and SWITCHGEAR.

LOCOMOTIVES

- 30-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.
- 20-T Jeffrey 250 V.MH-77 Mts. 44"-36" Ga.
- 15-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.
- 13-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.
- 10-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.
- 10-T West. 250 V. 907-C Mts. 36"-44" Ga.
- 8-T West. 250 V. 906-C Mts. 42"-48" Ga.
- 6-E West. 250 V. 903-B Mts. 22"-32" Ga.
- 6-T G.E. 250 V. HM-701 Mts. 22"-32" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK CO.

501 Grant Building Pittsburgh, Pa.

SUBSTATIONS

- 2—150 kw General Electric Synchronous Motor-Generator Sets, complete, 275 volts or 250-300 volts DC—2,300/4,000 volts AC, 3 phase, 60 cycle; 1,200 rpm. Type ATI Motor; Type MPC Generator.
 - 2—200 kw, 1,200 rpm., 250 volt DC, pedestal type G. E. Rotary Converters, with transformers and switchboards.
- Also motors, transformers & control.

R. H. BENNEY EQUIPMENT CO.

5024 Montgomery Road
Norwood 12, Ohio

AIR COMPRESSORS:

- 12—Belted, 380, 676, 870, 1,000, 1,300 ft.
- 12—Diesel 105, 315, 520, 676 & 1,000 ft.
- 6—Electric 1,300, 1,500, 2,200, 5,000 ft.

CARS & LOCOMOTIVES:

- 65-Ton G. E. Diesel Elec. Locomotive.
- 100—50 ton cap. Gondolas.
- 35—50 ton cap. Flat Cars.
- 8—100-ton, 45-ton, 30-ton Diesel Locomotives.
- 50—20 yd. cap. Air Dump Cars.
- 6—10, 16, 20 & 30 ton Gas Locomotives.
- 150—8,000 & 10,000 gal. cap. Tank Cars.
- 20—12 yd. Std. ga. Steel Dump Cars.

ELECTRIC LOCOMOTIVES:

- 15—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:

- 12—100, 150, 180 & 480 K.W.

MINE LOADERS:

- 17—GD9, Elmeo 21, Conway 20, 50, 60 & 75 and Sullivan HL3.

STEEL TANKS:

- 8—50,000 and 100,000 gal. Tanks on tower.
- 30—8,000, 10,000 and 20,000 gallon capacity.
- 9—80,000 & 20,000 bbl. cap.

SHOVELS-DRAGLINES:

- 7—1 yd., 1 1/2 and 2 yd. Gas & Diesels.
- 16 yd. Elec. 160 ft. Boom Dragline.

WANT BUY

Air Compressors and Locomotives.

R. C. STANHOPE, INC.

60 E. 42nd Street New York 17, N. Y.

CONVEYORS

BELT or DRAG

TRUCK SCALES—COAL CRUSHERS

COAL DRILLS

MINE FANS

JOY LOADERS

MINING & STRIPPING

EQUIPMENT

WHAT DO YOU NEED?

INDUSTRIAL EQUIPMENT CORP.

910 First National Bank Bldg. ATLantic 6387
Pittsburgh, Pa.

Electrical Equipment

Converters, Motor Generator Sets, A.C. and D.C. Motors, Control Equipment and Transformers.
We build equipment to fit your requirements. Over 25 years engineering background.

LOCOMOTIVE, Switching, Railroad Standard Gauge 33 Ton Gasoline Electric. Excellent Condition \$15,500.

ROBERT R. BOONE

Continental Hotel, Pineville, Kentucky

Used Motors For Sale

- 1 Westinghouse—7 1/2 H.P. @ 1150 250 V., D.C.
- 1 Westinghouse—25 H.P. @ 850, 250 V., D.C.
- 1 Crocker Wheeler—7 1/2 H.P. @ 1425, 230 V., D.C.
- 1 Crocker Wheeler—10 H.P. @ 825, 230 V., D.C.
- 2 Pawling & Harnischfeger, boom hoists, 4000# capacity, 12 feet lift, 250 V., D.C.

Best offer received takes the lot. Available for immediate shipment.

Templeton-Matthews Corporation

905 Sycamore Bldg.
Terre Haute, Indiana

Autocar dump trucks (4), 10-yd., gas, 1946.
Shovels—Cranes, 1 1/2, 2, 2 1/2, 4-yd.
Draglines, 3, 3 1/2, 5-yd., Diesel and elec.
Plymouth 10-ton gas locomotive, 36" gauge.
Locomotives: Diesel, gas, stm., 5-52 tons.
Fairbanks-Morse Diesel engines, 575 & 805 HP.
B-Erie 2-1/3 yd. shovel front att., (52B-55B).
H. Y. SMITH CO., 828 N. B'way, MILW. 2, WIS.

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1 1/2 to 10 Ton 13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

BUY FROM STOCK

Caldwell 200 tons Horiz. Hydraulic Wheel Press.
Oilgear 20,000# Hydraulic Horiz. Branch.
LeBlond 36" 30" Q.C.G. Engine Lathe.
Cincinnati #4 and #5 High Power Horiz. Millers.
American 24" Motorized Crank Shaper.

FALK MACHINERY COMPANY

18 Ward St., Rochester, N. Y.
Phone Main 6347

C. B. LOCKE CO.

P.O. BOX 3227
TEL. 38-136
CHARLESTON, W. VA.

NEW and REBUILT

503 KOEHRING DRAGLINE

powered with No. 13000 Caterpillar Diesel, 50 foot boom, 2 yd. capacity at 35'6" radius, 3/4 yd. at 60' radius. Operated less than 1,000 hours, in stationary position. Tracks like new.

MULLINS LUMBER COMPANY

Mullins, S. C.

REBUILT EQUIPMENT—READY TO SHIP

AXIAL FLOW VENTILATING FANS

- 5—50" dia. 72½" long. 2 sets of propellers. 8 blades to each. Dims: of blade 14"x9½" curved m'd by International. Size 114, driven by 100 HP., 1750 rpm. 220/440 v. 3 ph. 60 cy. A.C. Motor.
- 6—16000 CFM Buffalo Forge Co., 3" stat. pres. 1800/1200 rpm. con. 15/4.5 HP. 1710/1150 rpm., 3 ph. 60 cy. G.E. A.C. Motor 220/440 v. totally encl.
- 2—12000 CFM 3" stat. pres. Sturtevant with dir. con. 10/3 HP. 1775/1180 rpm., 220/440 v. West. CS. TEFC Motor.
- 1—7500 cfm Clarage with dir. con. 7½ hp., 1750 rpm., 3.3 hp at 1180 rpm., 220/440 v. 3 ph. 60 cy.
- 2—6000 cfm. Sturtevant 1.65" stat. pres. dir. con. 22/8 hp 220/3/60 A.C. Motor.
- 31—6000 cfm. Sturtevant Bulletin 512389, 3" stat. pres. 7 blade, dir. con. 5/1.5 HP. 1765/1175 rpm., 220/440 v. 3 ph 60 cy. West. TEFC Motors.
- 2—5000 cfm Sturtevant 1.8 stat. pres. 4.2/1.25 HP., 1750/1150 rpm., 3 ph. 60 cy., 220/440 v. ball-bearing motors.
- 2—4000 cfm 3" stat. pres. Sturtevant dir. con. 2 speed, TE Westinghouse 220/440 v. Motors.
- 1—4000 cfm 3" stat. pres. Sturtevant Axial Flow vent fan dir. con. 4/1.2 HP. 1750/1150 rpm., 220/440 v., 3 ph. 60 cy. Tot. Enc. West. Motor.

HOISTS

- 1—Welen—2 drum 8600± per drum, each drum is 6" cir. with 430 ft. of ¾" cable per drum can be increased to take 600'. 120 FPM per drum, driven by 25 HP., 1750 rpm., 230 V. D.C. motor.
- 1—Single Drum Triple Reduction Hoist, 28" dia. drum, 20" face, 1" flange, 27 grooves for ¾" rope—300' of rope with 10 HP. Westinghouse A.C. Slip Ring Motor 70/80 FPM.

HOISTS or WINCHES

- 200—1½-ton Hand Cranked ratio 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ¼" cable, ratchet type brake, push button release.

CAR PULLERS

- 100—Brand New with ¼" cable, 1½ and 2 ton A.C. or D.C. Motors.

LOCOMOTIVES

- 6 ton Atlas, 230 v. D.C.—36" gauge.

SPECIAL BARGAIN

- 100 KW. Diesel Engine Generator Sets
- 11—100 kw., 250/275 v. D.C. DeLoe Generators dir. con. to 150 HP. GBD-8, 5½"x7, 8 cyl. Superior Diesel Engines, elec. starting with muffler, power panel and accessories. ALMOST NEW—ONLY USED AS SPARES.

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

- 456—New, 1 HP. Cutler Hammer across the line.
- 111—New, 1 HP. Cutler Hammer across the line.
- 30—New, 2 HP. Cutler Hammer across the line.
- 55—New, 5 HP. Cutler Hammer drip proof 2 step current limit OL and LV.
- 58—New 7½ HP. Cutler Hammer.
- 60—10 HP. Cutler Hammer Magnetic.
- 12—10/15 HP. 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
- 9—New, 10/15 HP., 230 v. G.E.
- 10—New, 20/35 HP., 220 v. Ward Leonard Magnetic.
- 10—New, 40 HP., 230 v. G.E. Magnetic.

PUMPS — with AC or DC Motors

Qua.	GPM	Head	Make
2	1300	277'	Worthington
2	1200	300	Worthington
2	1100	323	Worthington
2 New	1000	346	Worthington
1	1000	370	Worthington
2	900	385	Worthington
8	800	378	Worthington
2	800	150	Worthington
2	700	388	Worthington
2	600	182	Worthington
1	600	220	Dayton Dowd
2	600	393	Worthington
2	400	196	Worthington
1	332	202	Worthington

230 V. D.C. MOTORS

Qu.	HP	Make	Type	Speed
2	200	Reliance	1970T	400
1	150	Gen. Electric	RCP-36	1700
1	125	Westinghouse	SK-190	560
4	100	Reliance	1050T	400
2	100	Westinghouse	SK-180	640
1	100	Gen. Electric	RC-58	650
1	100	Westinghouse	SK	650
2	90	Westinghouse	SK-183	575
1	75	Westinghouse	SK-160	850
3 New	75	Cr. Wh. TEFC		860
1	60	Westinghouse	SK-123	1750
1	60	Westinghouse	SK-153	850
2	50	Westinghouse	SK-143	850
1	35	Gen. Electric	DLC-203	700
2	35	Allis Chal.		1800
1	30	Allis Chal.		575
1	30	Westinghouse	SK-130	725
1	30	Westinghouse	SK-123	850
1 New	25	Westinghouse	SK-113	600
2	25	Westinghouse	SK-130	825
2	25	Westinghouse	SK	1100

MOTOR GENERATOR SETS—250 V., D.C.

Motors 220/440 volt or 2200 volt, 3 phase, 60 cycle.

No.	KW	Make	Speed
1	5	Allis Chalmers	1200
1	5	Westinghouse	1150
1	7½	Westinghouse	1150
1	10	Westinghouse	1750
1	10	Allis Chalmers	1200

1	15	Crocker Wheeler	1700
1	20	General Electric	1200
1	20	General Electric	900
2	30	Westinghouse	1150
1	30	Reliance	850
1	30	Westinghouse	720
1	35	General Electric	850
2	50	Westinghouse	1150
1	60	Westinghouse	1100
1 NEW	75	Crocker Wheeler	900
1	75	Westinghouse	720
1	100	General Electric	2100
1	100	General Electric	1750
2	100	Delco	1200
1	100	Westinghouse	700
1	200	Westinghouse	720
1	200	Westinghouse	1150
3	250	Westinghouse	1200

250 VOLT D.C. GENERATORS

No.	KW	Make	Speed
3	250	Westinghouse	1200
2	200	Reliance	500
1	110	Westinghouse-SK	700
4	100	Reliance	580
1	100	Westinghouse	720
2	100	Westinghouse-SK-180	900
6	100	Delco	1200
11	100	General Electric-RC	850
1	100	Westinghouse-SK	850
1	100	Westinghouse-SK	2100
3	75	Crocker Wheeler	1350
3	75	Crocker Wheeler	1150
2	75	Westinghouse-SK	720
1	75	Crocker Wheeler	1400
1	60	Westinghouse-SK	1100
1	50	Westinghouse-SK-143	1100

ENGINE GENERATOR SETS

- 10—NEW 1 kw 14.25 v. D.C. and 2 kw. 28.5 v. D.C. Homelite portable gas eng. Gen. sets. Can furnish lamps and batteries. Suitable for farms and camps.
- 3—5 kva. 120/240 v. 1 ph. 60 cy. Witte Diesel.
- 1—10 kw., 115 v. D.C. 1200 rpm., Hercules DIESEL.
- 30—NEW 25 kva. West. 120/208 v. 1 and 3 ph. 60 cy. LeRoi GAS.
- 1—35 kva. 220/440 v. 3 ph. 60 cy. 257 rpm., Ridgeway STEAM.
- 12—100 kw., 240/120 v. Delco 1200 rpm., dir. driven by 150 HP. Superior GBD-8 5½"x7" 8 cyl. DIESEL.
- 1—125 kva. G.E. 220/440 v. 3 ph. 60 cy., dir. con. Skinner UNIFLOW Engine.

SPECIAL BARGAIN AIR COMPRESSORS

- 5—240 CFM Westinghouse type 3 VS-23 3 cyl. vert., 150 lbs. pres. dir. con. to 50 HP., 220/440 or 2200 v. 3 ph. 60 cy. West. Slip Ring Motors, auto. Control. Can furnish D.C. Motors or Oil or Gasoline Engines if desired.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

Montrose — 5800

FOR SALE

CRUSHERS

- 1—McNally Pittsburg 24 x 24 double roll crusher.
- 1—McNally Pittsburg 24 x 48 multiplex single roll crusher.
- 1—Jeffrey 24 x 20 flex-tooth crusher.
- 1—Link Belt 36 x 60 double roll crusher, equipped with gear drive.
- 1—American Pulverizer crusher, No. 1627. Type AC, machine number AC3B, crushes from 20" down to ¼".
- 1—McNally Pittsburg 30 x 54 single roll crusher.

MOTOR GENERATOR SETS

- 1—100 KW GE motor generator set, 250 volt, DC, complete with switchboard.
- 1—50 KW motor generator set, AC end, 75 HP Westinghouse squirrel cage motor, type CS, 3 phase, 60 cycle, 220 volts, 1140 RPM, #1504189, DC end, 50 HP Crocker Wheeler, type CCM, 230 volts, 275 amps, #254053, complete with compensator for AC end.
- 1—100 KW Diesel Generator set with switchboard.
- 1—50 KW motor generator set, consisting of: 75 HP. Crocker Wheeler DC motor, compound wound, No. 254053, 230 volts, 273 amps, type CCM, size 50H, connected to 75 HP. Westinghouse AC motor, 220 volts, 1170 RPM, 3 phase, 60 cycle, 166 amps, type CS, No. 1504189, complete with compensator for AC end, but no switchboard for DC end.
- 1—50 KW motor generator set, AC end 2,200 volts, DC end 250 volts, complete with compensator. Perfect condition.

TIPPLES

- 1—Steel tipple complete with shaker and concrete silos. Capacity 1,000 tons per day.

PUMPS

All sizes and types of pumps.

MINING MACHINES

- 2—Sullivan type CH8, AC longwall mining machines, 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3 conductor mining machine cable.

- 2—Goodman, Universal mining machines, type 112-G3, 36" gauge.
- 1—Jeffrey 35BB, AC shortwall mining machine, 6' cutter bar, complete with tip turn truck, cable and reel.

- 1—Goodman Universal mining machine, 112AA, 42" gauge, 250 volts, DC, 8' cutter bar.
- 1—Sullivan 7B AC shortwall mining machine, 3 phase, 60 cycle, 220 volts.
- 1—Sullivan CLE 5 Longwall mining machine, 220 v. AC.

HOISTS

- 1—Ottumwa Iron Works single rigid cylindro-conical drum hoist, serial number 4080, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage, 6,000 lbs., weight of car, 1,600 lbs., weight of coal average 2,500 lbs., total cage travel 277 ft. (HMD) size of rope 1½", trips per hour 78, rest period 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter, 8" face. Direct connected to Western Electric 150 HP motor, 3 phase, 60 cycle, 440 volts, slip ring speed full load 700 RPM, complete with automatic switchboard.

- 1—Ottumwa Iron Works single friction drum hoist, serial number 3846 driven by double reduction gears. Built for 7,000 pounds of rope pull with rope speed of 250 ft. per minute. Equipped with a drum 48" diameter, 26" face not grooved, 60" diameter band brake, 48" diameter Lane type band friction clutch. Drum shaft 5 7/16" diameter, intermediate shaft is 4 15/16" diameter. High speed pinion is mounted on the motor shaft. Complete with 100 HP GE motor #628725, type 1-12-100A-600, form M, 3 phase, 60 cycle, 220 volts, 255 amps, speed no load 600, speed full load 570, equipped with controller and resistance.

- 1—Ottumwa Iron Works Hoist, serial number 3561, Drum is 48" diameter, 36" face grooved for 1" rope. Equipped with a post brake 54" diameter, hand operated. Has single reduction cut spur gears, 19 teeth and 196 teeth 1¼" pitch, 10" face. Drum shaft 7" diameter. Drum shaft bearings 7" x 14" pinion shaft bearings 4¼" x 15" of the ring oiling type. Built for the following hoisting conditions: weight of car 900 lbs., weight of coal 2,500 lbs., weight of cage 3,000 lbs., cage travel 250 feet, rope speed 700 ft. per minute. Built for balanced hoisting single rigid drum type, driven by single reduction gears, pinions being connected to the drum by a flexible coupling. Direct connected to 100 HP Westinghouse motor, type CW, 220 volts, 3 phase, 60 cycle, 360.8 amps to 580 RPM. #2394853 equipped with controller and resistance.

LOCOMOTIVES

- 1—15-ton Goodman locomotive, 42" gauge.
- 1—6-ton Jeffrey locomotive, 42" gauge.
- 1—5-ton Jeffrey locomotive, 42" gauge.
- 1—4-ton Whitcomb battery locomotive, 36" gauge.

TRANSFORMERS

- 2—75 KVA GE transformers, type H, form G3, 60 cycles, voltage 11,500—2300/4000, serial #1043840, and #104229.
- 2—250 KVA Adams Ragnall transformers, serials 46299, 42688, 60 cycle, 13200/2400, taps 5 and 10 Pol. Add., single phase, rebuilt by Albertson Electric Company, Milwaukee, ON 23387.6.42.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.
CANTON, ILLINOIS

CRANES-MOTORS and ELECTRICAL EQUIPMENT

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SQUIRREL CAGE MOTORS 3-PHASE, 60-CYCLE					
Qu.	HP.	Make	Type	Volts	RPM.
2	40	Al. Ch.	AR	440	860
1	40	Master	PA-445	440	1200
1	50	Whse.	CS	440	690
1	50	F.M.	H-16-A	440	900
1	50	Al. Ch.	AR-220D	440	1155
1	50	Ideal	AT-445	440	1750
1	60	Whse.	CS-607	440	880
1	75	G.E.	NF-542	440	1200
1	75	Whse.	CS	440	1750
1	75	Al. Ch.	AR	2300	1785
5	100	F.M.	HS-201C	440	880
2	100	G.E.	KT-556	2200	865
1	100	Whse.	CS-760	2300	1170
1	100	G.E.	K-544	2300	1175
1	100	Al. Ch.	AR	2200	1160
1	100	G.E.	I-K	440	1800
2	125	Al. Ch.	AR	440	435
2	125	C.W.	126Q	440	430
1	125	Whse.	CS-761	440	1750
2	125	Al. Ch.	AR	2200	1750
1	150	G.E.	I-K	440	690
1	150	El. Mch.	B.B.	220	1200
1	250	Whse.	CS	2200	1160

SLIP RING MOTORS — CONSTANT DUTY 3-PHASE, 60-CYCLE					
Qu.	HP.	Make	Type	Volts	RPM.
1	25	G.E.	MT-526	440	840
1	25	G.E.	MT-332	2200	850
2	25	Whse.	CW-4810	220	1750
1	30	Whse.	CW	440	1160
1	40	Al. Ch.	ARY	2200	435
3	40	G.E.	MT-346	550	560
3*	40	G.E.	I-M	600	1170
1	50	Al. Ch.	ARY	2200	490

2	50	G.E.	MT-536	2200	1150
1	75	G.E.	MT-548	440	1200
1	125	Al. Ch.	ARY	440	900
1	150	G.E.	I-M	440	495
1	150	G.E.	I-M	440	1180
1	200	G.E.	I-M	2200	1750
1	200	G.E.	I-M	440	580
1	250	Whse.	CW-1106	2200	580
1	300	Al. Ch.	ARY	2200	505
1	300	G.E.	I-M	2200	1200
1	400	G.E.	I-M	2300	875
1**	600	G.E.	MT-412Y	2200	720
1**	750	G.E.	MT-414Y	2200	709
1**	1200	Whse.	CW	2200	590

*—10-Cycle.
**—Mill Type 2-Pedestal Bearing on Cast Iron Base. Complete with Reversing primary and Magnetic Secondary Control.

SYNCHRONOUS MOTORS 3-PHASE, 60-CYCLE					
Qu.	HP.	Make	P.F.	Volts	R.P.M.
2	50	G.E.	.8	2200	600
1	60	G.E.	.8	440	1200
2	100	G.E.	.8	440	600
1	100	Ideal	.8	220	900
1	150	G.E.	1.0	2300	900
2	200	Al. Ch.	1.0	2300/440	360
3	1250	G.E.	1.0	4160/2300	900

MOTOR GENERATOR SETS					
Qu.	KW	Make	RPM.	Volts D.C.	Volts A.C.
1	5 1/2	G.E.	1800	250	220/440
1	9	G.E.	1800	250	220/440

7	25	Whse.	1200	120/240	220/440
3	50	Whse.	1200	120/240	440/2300
2	35	G.E.	1800	125	220/440
1	50	Lo. Al.	1300	120/240	440/2200
1	75	Whse.	1200	125	220/440
1	75	Al. Ch.	900	250	2200
1	100	G.E.	1200	250	440/2300
1	100	C.W.	1200	250	440/2300
3	150	C.W.	1200	300	440/2200
1	300	Whse.	1200	125/250	2300
1	400	Whse.	720	550/275	2300
2	1000	G.E.	514	600	4150/2300

G.E. Rotary Converter, 2025/2565 KW, 225/285-VDG., 450-RPM., complete with A.C. and D.C. panels and control, 2760 K.V.A. transformer, OISC. 6900-V., 3-Ph., 60-Cy.

TRANSFORMERS (OIL COOLED)					
Qu.	K.V.A.	Make	Voltage	Phase	Cy.
2	10	Whse.	2400-480/240	1	60
2*	13	Klmm.	480/240	1	60
1	25	Al. Ch.	2300-460/230	1	60
1	30	G.E.	2200/1100-608	1	60
3*	37.5	Whse.	460/230-230/115	1	60
3	50	Al. Ch.	22000-220	1	60
2	50	Wagnr.	13200/11880-575/287	1	60
14 (New)	100	G.E.	4330/4160-125/250	1	60
6	190	G.E.	2400-125/250	1	60
3	130	G.E.	19000/9500-2200/550	1	60
3 (New)	150	Wagnr.	8800/440-2300	1	60
3	165/247	G.E.	35500/22000/11000-430/215	1	60
3	667	G.E.	2300/4000Y-460	1	60

*Air cooled.

T. B. MAC CABE COMPANY.

4314 CLARISSA STREET

PHILADELPHIA, PENNA.

LOCOMOTIVES & CRANES

80 ton Lima 6 wheel Switchers. New 1944.
65 ton Whitcomb Diesel-Electric. New 1944.
50 ton Gen. Elec. Diesel-Electric.
70 ton Porter Fireless steam locomotive.
30 ton Plymouth Gas Locomotive. New 1944.
2 yd. Lima Diesel Crawler Crane. 100' bm.

MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St. St. Louis, Mo.

FOR SALE

All Bronze Centrifugal Pumps:

1—Hazelton 8", 3 stage, 1,300 GPM, 325 Head, 150 HP.
1—Hazelton 10", 3 stage, 2,000 GPM, 300 Head, 200 HP.
1—Hazelton 6", 3 stage, 1,000 GPM, 300 Head, 100 HP.
1—Hazelton 6", 2 stage, 1,200 GPM, 320 Head, 125 HP.
2—Hazelton 4", 4 stage, 600 GPM, 300 Head, 75 HP.
1—DeLaval, C.I. Bronze Impeller, 400 GPM, 250'.
1—DeLaval, C.I. Bronze Impeller, 1,000 GPM, 160'.
All rebuilt. Motors 2200/440/220/550.
Motors, hoists, transformers, MG sets and other items available.

E. P. DIETRICK

Phone 3-7357 Scranton 9, Pa. 829 Richmond St.

FOR SALE

4 Goodman Style G20B77 permissible Shaker Conveyors, latest type with 300 ft. size 3 troughs, manual Type HAD duckbill and 20 HP Westinghouse AC motor, 3 phase, 60 cycle, 220 volt, 1160 RPM.
4 Sullivan Class 7B Cutting Machines, with 50 HP AC motor, 3 phase, 60 cycle, 220 volt, and Bowditch cutter bar and chain, 9 ft. long, 5" kerf.
4 Chicago Pneumatic Style 574-700 post mounted coal drills, 220 volt, 60 cycle, 3 phase, AC.
All of above to include usual accessories and guaranteed to be in A-1 condition. New in 1943.

KAISER COMPANY, INC.

Iron & Steel Division
Sunnyside, Utah

REBUILT MINING MACHINES

4—112 A. A. Goodman Universal D. C.
1—112 G 3 A Goodman Universal, 220 volts A. C.
1—12 G 3 Goodman Standard, 220 volts A. C.
4—35 B Jefferies Machines, D. C., 250 volts.
4—C E 7 Sullivan, A. C. and D. C.
2—7 B Sullivans, D. C., 250 volts.

LOCOMOTIVES

2—6 ton Goodman type 33 Ball Bearing.
1—8 ton Goodman type 32 Ball Bearing.
1—6 ton G. E., 42 inch gauge.
1—5 ton Mancha Storage Battery Locomotive, 42 inch track gauge, height 40 inches. Complete with storage batteries and charging panel.
2—6 ton Westinghouse Ball Bearing.

LOADING MACHINES

1—14 B. U. Joy 42" Gauge on Cats, D.C.
3—5 B. U. Joy, 42" Gauge on Cats, D.C.

THOMAS GILLESPIE & SONS
State Rd. 67 — Bicknell, Ind.
Phones 179 and 149 L. and 149 K.

RAILS

NEW AND
RELAYING

From
5
Warehouses

Track Accessories
• Prompt Shipments
• Fabricating Facilities
• Trackage Specialists

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PITTSBURGH SAN FRANCISCO

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TRACK ACCESSORIES

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EVERYTHING FOR THE TRACK FROM SWITCH TO BUMPER

2,800 Tons in Stock

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40 # and Heavier Sections
Accessories and Switch Materials

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RAILWAY SUPPLY CORP.

RAND BLDG., BUFFALO 3, N. Y.
EMPIRE BLDG., BIRMINGHAM 3, ALA.
CONTINENTAL OIL BLDG., DENVER 2, COLO.

RAILS — CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

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Reno, Nevada Carnegie, Pa.

MOORHEAD ELECTRICAL MACHINERY CO.

PITTSBURGH 19, PA.

M-G SETS—ROTARIES

(3 ph. 60 cy.)

500 KW West. factory built M G Set—running inspection—consisting of 500 KW 250 v. 900 RPM cpd. Interpole dir. conn. common base 714 HP Syn. Motor 8 P.F. 2300 v. with manual starting panel including magnetic excitation relays, also standard DC Panel. Good condition. Immediate shipment.

300 KW 250 v. G.E. 600 RPM Rotary with 3—110 KVA Trans. 2300/4000 v.

100 KW West. SK 125 v.—150 HP West. Ind. 1200 RPM. 220/440 v.

150 KW West. 125 v.—250 HP Ind. 2200 v.

100 KW 250 v. G.E.—150 HP Ind. West.

75 KW 75 v. West.—100 HP West. Ind.

50 KW 125 v. G.E.—75 HP G.E. 2200 v.

40 KW 250 v. West.—60 HP West. Ind.

15 KW 125 v. Wotten—25 HP 220/440 v.

10 KW 125 v.—15 HP Master, 220/440 New.

AC AND DC GENERATORS

60 KW 60 v. 1000 amp. West SK Welding.

1 150 KW West. SK 125 v. 1200 RPM.

300 KW West. 250 v. 1200 RPM.

150 KW G.E. Type RC 550 v. 1150 RPM.

90 KW 60 v. 1500 amps. West. SK.

AIR COMPRESSORS

1100 cu. ft. 100 lbs. Chg. Pneu. 2 stage, 19" & 12"x12" with Intercooler, aftercooler, unloader, air receiver dir. conn. 215 HP West. Syn. Motor 2200 v. 3 ph. 60 cy. 257 RPM with belted 8 KW SK West. exciter and manually operated starting panel. Good condition. Immediate shipment.

750 cu. ft. 100± pres. Chlc. Pneu. 2 stage Type OCB 17 & 10 x 12".

356 cu. ft. 100± pres. Chlc. Pneu. 12 x 10.

245 cu. ft. 100± pres. Ing. Rd. ERI. 10 x 10.

175 cu. ft. 100± pres. Chlc. Pneu. 9 x 8.

164 cu. ft. Ch. Pneu. Steam Type.

AC MOTORS (3 ph. 60 cy.)

HP.	Make	Wdg.	Spd.	Type
300	West.	S.R.	600	CW
300	G.E.	S.R.	450	I-M
150	G.E.	S.A.L.	435	I-K
150	G.E.	Swm.	600	ATI
125	West.	Swm.	277	
100	G.E.	S.R.	450	I-M
75	G.E.	S.R.	600	I-M
75	G.E.	S.R.	575	ITC

75	G.E.	S.R.	600	I-M
75	G.E.	S.R.	575	ITC
50	G.E.	S.R.	900	I-K
50	West.	S.R.	600	CW658 D
50	G.E.	S.R.	900	I-M
50/12½	G.E. 2200 v.	S.R.	900/450	I-M
25	Cr. Wh.	S.R.	580	
25	Cr. Wh.	S.C.	860	

LOCOMOTIVES

Haulage and Gathering Locomotives

20 Ton Jeff. & G.E. 550 v. 42" Ga.
(Can be rewound 250 v.)

13 Ton West. 36 or 40" Ga., 250 V.

8 Ton Goodman Explosion tested 500 v. 42/44" Ga.

6 Ton West. 250 v. 904 Motors 36" Ga.

STORAGE BATTERY LOCOMOTIVES

6/7 Ton Jeffrey 42/44" Ga. BB Motors.

6 Ton G.E. perm. 36/44" Ga. HM 825 BB.

5½ Ton Ironton Type A 36/42 Ga.

MINING MACHINES

112 EG3 Goodman AC Univ. Shortwall 440/3/60 #6593

—35 HP Flameproof. 6½" bar.

112 DG3A Goodman AC Short wall, 440/3/60 #7896—

50 HP Univ. 6½" bar.

2—12 DA Goodman 250 v. DC 6½ to 7½" bars.

1—112 DA Goodman Universal, 250 v. 7½" bars.

2—35 B Jeffrey, 250 v., 6½ to 7½" bars.

DC MOTORS

HP.	Make	Voltage	Wdg.	Speed
15	West. SK 110	230	cp.	750
15	West. SK 83	230	sh.	350
15	Cr. Wh. CM	230	sh.	1400/1700
20	West. SK70L	230	cp.	1750
20	Cr. Wh. CMC	230	sh.	1200/1700
20	G.E. DLC	500	sh.	400/1200
20	West. SK 110	230	sh.	900
25	West. S.	230	sh.	325/975
25	West. SK 113	230	cp.	900
40	G.E. RC 34	230	sh.	750
40	G.E. RC	230	sh.	1150
50	West. SK	230	sh.	1750
60	Rel. T461	230	sh.	800/1200
125	West. SK 193	230	sh.	450/1000
200	G.E. RC	500	cp.	875
375	West.	230	cp.	430/860

ENGINE & TURBINE UNITS

6-cyl. Sterling Gas or Gasoline Engines, 72 HP at 800 RPM to 210 HP at 2,000 RPM.

50 KW West.—Turbo 125 v.

100 KW Delco 250 v. Gen.—Superior Diesel.

300 KW West. 125/250 v. DC—West. Turbine 440± Pres.

2-400 KW G.E. 250 v.—Skinner Steam Eng.

HOISTS, CRANES AND PUMPS

400 HP Vulcan conical drum shaft Hoist.

400 HP Vulcan single fixed cylindrical drum 78" dia. 5' 4" wide—AC Motor.

75 HP Diamond agl. fr. 48" dia. 25" face.

75 HP Mead Morrison agl. fr. drum—AC Motor.

1—50/75 HP 2 drum Meade Morrison slope.

40 HP Ligerwood agl. ft. drum geared to A.C.

25 HP agl. friction Hoist—230 v. DC Motor.

10 Ton Larry Car, 500/250 v. DC.

10 HP Fridy Car Puller, AC Motor.

Lawrence Cent.—50 HP, AC Motor.

Gardner Cent.—50 HP, 230 v., DC Motor.

Weinman Cent.—50 HP, 230 v., DC Motor.

5—½ Ton AC agl. mtr. Coneo Hoists.

5—1 Ton Shepard 230 v., DC Hoists.

2—2 Ton Shepard DC 230 v. Hoists.

TRANSFORMERS

Qu.	KVA	Make	Prim. V.	Sec. V.
3	150	Westgh.	2200	220/440
3	15	Penna.	2200	110/220
3	10	West.	2200	110/220

CONVEYORS

G15 and G12½ Goodman Conveyors, 230 v. DC with pans and duckbills.

Jeffrey 30' Bucket Elevator Vertical Conveyor.

DC MAGNETIC STARTERS

3—10 HP 230 v. Mag. Rev. Dyn. Braking.

1—25 C.H. 230 v. dripproof. H.P.

4—30 HP EC & M. 230 v. Magnetic.

3—40 HP W.L. 230 v. dripproof.

4—60 HP C.H. 230 v. dripproof.

4—75 HP C.H. 230 v. dripproof.

1—100 HP C.H. 230 v. dripproof.

1—150 HP C.H. 230 v. dripproof.

AC MAGNETIC STARTERS

6—43½ Clarke Mcha. Tool 440/3/25 cy.

2—700 HP West. 220/3/60 Line Starters.

LOOK — BUY — SAVE

Real Bargains

COPPER WIRE

4/0 Grooved Trolley

1,000,000 CM—500,000 CM Bare

MINE CARS

3 Ton, 48" Gauge, 29" high

HOISTS

Single and Three Drum—New

HAND WINCHES

All-Steel, Three Ton Capacity

WELDERS

400 Amp Lincoln, 220/440 Volt

Also 300 Amp New Gas Welders

TANKS

8,000 — 10,000 — 12,000 Gallons

I BEAMS

10 Inch—Heavy Section

ROTARY CONVERTERS

General Electric, 50 KW, 2300 primary, 275 DC volts

MANSBACH METAL COMPANY

Logan, W. Va.

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3—D 8s—Dozers—D.D.P.C.U.

4—D 6s—Dozers—D.D.P.C.U.

Tractors used 100-400 hours.

Carry New Tractor Warranty.

NEW AND REBUILT EQUIPMENT

1—D-8 Dozer—D.D.P.C.U., 1H Series.

1—Bucyrus-Erie Shovel 2½ c.y. Rock Front.

1—1947 P & H Shovel ¾ c.y.

1—New Truck Crane 7½ ton cap.

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369 Lexington Ave., N.Y.C. Lex. 2-3868

CRAWLER AND LOCO CRANES

1—25 ton Marion Diesel Crawler 1½ yd. shovel front D/L attachm'ts. 60" bm. D13000 Caterpillar Diesel engine, 33" cat. first class condition.

1—¾ yd. same as above, Marion No. 332.

2—¾ yd. Buckeye Gas Shovels and Cranes.

1—Link Belt K45 Crane and D/L 70' bm. Wisc.

1—2½ yd. Koehring Diesel D/L Crane with 80' boom.

MINE AND SLOPE HOISTS

1—40000± Vulcan Dbl. Drum AC.

1—35000± Nordberg Sgl. Drum AC.

1—10,000 lb. cap. Vulcan Sgl. Drum Hoist 4' x 4" drum 250 HP, AC.

1—5,000 lb. cap. Lidgewood Sgl. Drum Electric Hoist, 600 FPM, GE motor, 100 HP, AC.

HOIST MOTORS

1—200 HP, GE 2300/3/60 AC 585 RPM Motor with control.

1—225 HP, GE Motor for 440/3/60 AC, 585 RPM with control.

1—300 HP new Allis Chalmers slip ring motor 600 RPM for 2300/4000 AC.

CONVEYORS

1—1275 ft. 42" belt Conveyor with drive.

1—300 ft. 60" ditto.

1—275 ft. 48" ditto.

CRUSHERS

1—24 x 24 Bbl. Roll Crusher.

DIESEL MOTORS

3—6 cyl. 280 HP Cummings Diesel Motors.

GENERATING UNIT

1—750 KVA Westhse 440/3/60 AC Generator with Nordberg Uniflow Steam Engine, complete. Bargain.

AERIAL TRAMWAY

1—Aerial Cable Tramway, 1250 ft. long x 1½" rope with haul rope. Motor 60 HP, AC.

COMPRESSORS

1—600 ft. Ir. 2 stage motor driven compressor, Imperial Type for 220/440/3/60 AC.

1—900 ft. Sullivan WJ Angle Compound Compressor with 150 HP. GE Motor, 220/440/3/60 AC.

DERRICKS

1—25 ton, 3 drum Stiff Leg Derrick with 90' bm., AC.

HAWKINS AND CO.

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1—300 Ton Caldwell Horizontal Wheel Press.

1—Niles Bement Pond Wheel Lathe. Will turn up to 42" Wheels.

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COAL HAULERS
 AVAILABLE FOR IMMEDIATE DELIVERY—LOCATION INDIANAPOLIS
3 DART 120 TRACTORS with Austin-Western Trailers

Three Dart Model 120 Tractors powered by 6 cylinder HX HERCULES gasoline engines, 14:00 x 24-20 ply rear tires, 11:00 x 24-12 ply front, Austin-Western 25-ton air controlled bottom dump trailers with 14:00 x 24-20 ply tires.

ALSO AVAILABLE

One 1 3/4 yd. Page Model 411 Dragline. One 3/4 yd. Lorain 40 Dragline. One Bucyrus-Erie 32B shovel dragline. One 100 ton Fontaine trailer. One American Coal Crusher, 75 H.P.

DART 120 TRACTORS with Austin-Western Trailers



REID-HOLCOMB CO. Inc. 1815 KENTUCKY AVENUE INDIANAPOLIS, INDIANA

FOR SALE

JOY—14BU-7RBE, Serial 6188, Rt.-hand control, 40-46 gauge, LONG TYPE CONVEYOR; loaded less than 60,000 tons of coal.
 GE-TYPE HM-801-F LOCOMOTIVE, Serial #5651—42" track.
 GOODMAN TYPE 12CA SHORTWALL, Serial #3242—42" track.
 All above 250 Volt DC, first class, subject to inspection.
 15—SANFORD DAY, all steel, drop bottom CARS, 42" gauge, 4 tons heaped.
 3—20KW—6900 to 220-110 Volt TRANSFORMERS.
 75 KW—SKINNER, direct connected GENERATOR UNIT, 3-phase, 60 cycle, 2300 Volt, 75# to 125# steam pressure. Good.

PIKE COUNTY COLLIERIES
 INCORPORATED
 PIKEVILLE, KENTUCKY

HOIST FOR SALE

200 HP, Single Drum, 8' dia. x 5'6" long, with automatic controls and air operated brake. Heavily constructed and in excellent condition.

G. & W. H. CORSON, INC.
 Plymouth Meeting, Pa.

Modern all steel seven bin tippie with shaker screen, shaker gates and crusher, suitable for rail or truck loading.

Two Bruce-McBeth, 300 H P each, natural gas engines direct connected to 150 KW Burke D C generators.

Cooper-Bessemer 250 H P direct connected to 150 KW Westinghouse D C generator, all engines with compressors, starting tanks and switch boards.

Approved type D C Rock Duster.

Ingersoll-Rand track mounted compressor, jack hammer, hose and bits.

55 Edison Model K Electric car lamps with charger, rack and spare parts.

HARRISON & QUINETTE COAL CO.
 R.D. 2, Glenshaw, Pa.

Mine Phone Dorseyville 80-J, Evenings
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FOR SALE

Several IHC K-6 tractors with K-7 sleeves, 1946 models; excellent condition; suitable for dump trucks.

Columbia Transportation Service, Inc.
 951 Freeman Ave., Cincinnati, Ohio
 Main 8594

1 1/2 yd. Northwest Diesel Crane #6.
 Cummins engine \$14,500.00.
 Shovel front, extra \$3000.00.

G. W. KAUFMAN
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FOR SALE

1—Semi Diesel—Fairbanks Morse—2 cylinder horizontal, 90 H.P. engine—connected to 70 K.W. belt driven generator.
 1—12A Goodman—bottom cutting machine.
 1—4 ton Jeffrey haulage locomotive.
 100 tons of good used 16 and 20 lb. mine rails.
 1500—42 in. gauge double latch steel mine ties.
 500 ft. 30 in. diameter steel tubing 1/4 in thick, 10 ft. sections.
 2—Coal drills.
 3000 ft. trolley wire, copper.
 20—End dump 42 in. gauge, 1 1/2 ton mine cars, 27 inches high.
 2—Mine fans and motors.

The above equipment in good working order and ready for immediate delivery. If in the vicinity of Morgantown, W. Va., Write, Wire or Call—

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RATLIFF COAL CO.

D. R. Halley, President

Box 172—Telephone 692 M, Pikeville, Ky.

FOR SALE

1 Joy Loader Newly Rebuilt.
 1 SA Morton Gardner cutting machine and truck.

CAPTINA COAL COMPANY
 Powhatan Point, Ohio

FOR SALE

2—35 B Jeffrey A.C. Shortwall Machines

Stoetzer Coal Company
 Robert Mine, Shinnston, W. Va.

MINE HOIST: All steel construction, single drum, 8' dia., 3,700 ft. 1 1/2" rope, single line pull capacity 73,000 lbs. with herringbone gears to operate at a speed of 200 or 600 FPM; motor 400 H.P., 580 RPM, 3 phase, 60 cycle, 2,200 volt, complete with all control equipment. Condition like NEW. Located in California.

GODDRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW):

1—Piece 1014 ft.
1—Piece 1017 ft.
1—Piece 268 ft.
6 ply, 42 oz. duck, 7/32" top cover, 1/16" bottom cover, on original reels.
All NEW, NATURAL RUBBER.

TURBO GENERATOR: Curtis Steam Turbine driven Generator Unit, 600 KW, 5 stage, 200 lbs. steam pressure, 3600 RPM, with condenser, General Electric Generator, 750 KVA 2300 volt, 3 phase, 60 cycle, with exciter, piping, valves, etc.

COAL PULVERIZER: Kennedy Van Saun Air Swept Pulverizer Mill, 4' x 7', capacity 3600 lbs. of fuel per hour, 40 H.P., A.C. motor, 7 1/2 H.P. pulling fan, 1/2 H.P. coal feed motor, complete with all instruments, etc.

PUMP: Worthington 40 H.P. steam driven Centrifugal Pump, 300 lbs. steam pressure, 3550 RPM, with steam regulator. Complete, in new condition.

BOILER: Ames 80 H.P. Package Unit, catalog A-80, 125 lbs. steam pressure, oil fired equipment, used only eight months.

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BARGAINS FOR SALE 100 KW. Diesel Engine Generator Sets

11—100 KW., 250/275 V. D.C. Delco Generators dir. con. to 150 HP., Model GBD-8, 5 1/2 x 7, 8 cyl. Superior Diesel Engines, elec. starting with muffler, power panel and accessories.

2—100 KW., same as above with 220 or 440 V., New A.C. Generators.

PRACTICALLY AS GOOD AS NEW
ONLY USED FOR SPARES

Duquesne Electric & Mfg. Co.

Pittsburgh 6, Pa.

BRAND NEW—IN ORIGINAL CARTONS

Westinghouse Blasting Galvanometers Type PX-12

Complete with sling and leather carrying case, Ag. CL battery. Regular list \$17.50. While they last—Our price \$9.95.

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FOR SALE

2 150 hp Fairbanks-Morse Vertical Engines with 125 K.W. Generators. Excellent Condition.

1 5x5 Deming Acid Resisting Pump, good condition.

1 Cincinnati Drill, New.

25 Stop blocks.

700 new 16# splicebars.

25 42" gauge Timken roller bearing steel cars, 28" high, 11' long, 56 wide lift end gates.

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CONVEYOR BELTING.
TRANSMISSION BELTING.
ELEVATOR BELTING.
FIRE, WATER, AIR,
STEAM, SUCTION and
WELDING HOSE.

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	24"	4	1/8"	1/32"
42"	5	1/8"	1/16"	20"	5	1/8"	1/32"
36"	6	1/8"	1/16"	20"	4	1/8"	1/32"
30"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	5	1/8"	1/16"	16"	4	1/8"	1/32"
26"	5	1/8"	1/32"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

ENDLESS "V" BELTS

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
Inquire For Prices —
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SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED		
I.D. Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
1/2"	25 feet	\$5.00	\$1.50 Pair
	50 "	10.00	1.50 Pair
3/4"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
3/4"	25 feet	\$4.25		35 feet	\$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1 1/2"	25 "	10.00
1 1/4"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

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**25 NEW APPROXIMATELY 10,000 GAL. CAP. R. R. TANK
CAR TANKS, 81 IN. DIA., 37 FT. 2 3/8 IN. LENGTH
OVERALL, BOTTOM SHELL 3/8 IN., TOP 1/4 IN. —
TESTED 60 LB. PRESSURE. TANKS ARE ON STEEL
FRAMES — LOCATED NEW JERSEY.**

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Telephone Bryn Mawr 1769

IMMEDIATELY AVAILABLE—MINING EQUIPMENT

MINING MACHINES

Jeffrey: 2—35B, 28A, 250 V. 1—24B Low Vein.
4—29B, 29C, 29CE with shearing head. Also 1
on cast. Revolving head for 29C. 2—Longwall 24B.
Goodman: 12A, 12AB, 12AA, 12G3A, Shortwalls.
124 EJ Slabbers.
1—12G3, 220 volt.
1—Hitch Cutter for Cross Head timbers.
2—Goodman Slabbing Machines, permissible type,
250 and 500 volts.
Sullivan: CE7, CE9.

SUBSTATIONS—275 volts, D. C.

1—75 KW G. E. Rotary Converter.
250 volt D. C. transformers.
220-440—2300/4000.
1—300 KW W. H. 3 phase converter.
275 D. C. transformers 4000/6000 A. C.
1—100 KW W. H. MG Set.
275 D. C. 2300 volt A. C.
1—100 KW G. E. MG Set.
275 D. C. 440 volt 400 A. C. in portable build-
ing.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30 B 43" 1—5 ton, 2600-R.
1—5 ton 8-30 36" gauge.
1—6 ton type 8A.
Westinghouse Units: All 250 volts.
905, 102, 904 and 115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volts.
6 ton 803, 44" as is.
8 ton 839.
1—8 ton type HM 61, 36" gauge.

LOCOMOTIVES

5 ton 825, 44" and 36".
8 ton 839.
2 motors for 8 ton 839.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH
12, Locomotive motors and Crabs and Reels for
Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH73, MH73 and MH64-350 V.
and 500 V. 29B, 35B and 28A. 35BB, 35A, 29C,
29L, 35L.
Goodman: 30B, 30C, 12A, 12AB, 12AA.
General Electric: 801, 819, 821, 825, 839, 61.
Westinghouse: 904, 905, 102, YR2, 115, 250 V.
Bracket Type, 150 KW G. E. HCC.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners: 2 Sullivan, 1 Diamond.
Blue Print Machine: 42" wide, continuous Mercury
Arc Light.
Bond Welders: Resistance.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt, 600 amps.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Coal Crushers: (double roll) 16"x16", (single roll)
24"x24", 30"x30", 18"x18", 12"x16".
1—Pulverizer 30" Williams #3 Coal Crusher.
Conveyors: Scraper type. Apron and grate bar
screening type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators.
Drop Bar Supports: (Gooseneck) 29B and 29C.
1 Revolving head for 29C.
Dumps: Crossover.
Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW.
1—AC Generator, 31.3 KVA, 3 ph. 208 volt, Gen-
eral Electric with Exciter.
Hoists, overhead: AC 3-60-400 1 ton and 2 ton.
Crabs and Room Hoists. Also single and double
drum.
Lathes: 48"x14" with Taper Attachment and
3-60-220 Motor.
Loading Machines: 2—Myers-Whaley #3 and 4.
1—4BU Joy loading machine.
1—12BU Joy loading machine.
Milling Machines: horizontal and vertical.
Mining Machine Trucks and 2 on Catts. for short-
wall and are watt.
Monitors.
Motor Starters and Controllers: AC and DC.
Synchronous Motor Starters, full magnetic, across
the line. 3-60-4150, 2-200 H.P. and 7-250 H.P.
1—165 H.P., 440 volt for slip ring motors.
1—100 H.P., 250 volt D.C. Both reversible.
Pumps: Rebuilt and New.
Scales: Mine Car and Truck.
1—State Larry.
1—Car haul trip maker.
Transformers: 4-55 KVA 23,100/12,000 to 103/208.
3-35 KVA. 22000/12,000 to 178/89 volts. 3-100
KVA KVA 6600/12,000 to 2300.

GUYAN MACHINERY COMPANY, Logan, W. Va.

AVAILABLE FOR IMMEDIATE SHIPMENT

DC MINING MACHINES

7—7B Sullivan Permissible, Only
slightly used, 230 volt, Std. 8 ft.
C. B., Cincinnati chains, mounted
on Joy T1-1E Permissible Cat.
Trucks.
1—12 AB Goodman, 6½' C. B., 250
volt.
1—112AA Goodman Universal, 8½'
C. B., 250 volt.
1—512 Goodman Permissible with
std. truck, 42" TG, 6 ft. C. B.,
250 volt.
1—35BB Jeffrey 7½ ft. C. B., 250
volt.
1—35B Jeffrey shortwall, 550 volt.
2—35B Jeffrey shortwall, 250 volt.

LOCOMOTIVES

1—HM 821 GE, 6 ton, 42" T. G., 250
volt.

1—905 Westinghouse, 6 ton, 42" T.
G., 250 volt.
1—MH 78 Jeffrey, 10 ton, 44" T. G.,
250 volt, 27½" high, MB-26 cont.
1—MH 96 Jeffrey, 4 ton, 42" T. G.,
250 volt.
1—MH 73 Jeffrey, 10 ton, 40" T. G.,
250 volt.

MISCELLANEOUS

6—Axial Flow Exhaust fans, 35,000
CFM, 14.5 HP comp. wd. DC,
230 volt, BB motor, 1330 r.p.m.
1—Brown Fayro car spotting hoist,
5 HP, AC or DC motor, 1500 lb.
pull.
3—100 KW Diesel generator sets,
275 volt, complete with switch-
boards, marine type, 1200 r.p.m.
2—Heavy slope hoists, marine type,
revamped to your specifications.

NATIONAL MINE SERVICE COMPANY

Bemeco Division
Beckley, W. Va.

All-State Division
Logan, W. Va.

SHAKER CONVEYOR

Two (2) 15 HP, 230 volt, Goodman
Type G15B82 Shaker conveyor, un-
derneath drive, complete with Type
EIC size 1 duck bill, 600 feet of
BIAWG13 standard troughs, size 1,
swivels and ball frames.

This equipment is in A-1 condition
and is now in use, however, it is
available for immediate delivery.
Price \$7,800.00.

Jones and Heatherman Coal Co.
PEACH CREEK, W. VA.

FOR SALE

1—G.E. 4 stage, 175 lb. condensing,
2500 K.V.A 2300 volt turbo generator
complete with auxiliary equipment.
1—G.E. mixed pressure, 140 lbs. 16
A.B.S. condensing, 750 K.V.A., 2300
volt turbo generator complete with aux-
iliary equipment.

The above turbo generators will be
taken out of service in October, 1948,
and can be inspected under load in the
meantime.

F5-6598, COAL AGE
520 No. Michigan Ave., Chicago 11, Ill.

FOR SALE — IN STOCK

(Mostly at Norton, Virginia)

1 Sullivan Buddy Machine, 20 HP 250 Volt
Ball Bearing Motor, 5½' Thin Kerf Cut-
ter Bar.
1 6-Ton Jeffrey Locomotive—HM-88 BB
Motors 250 V.—New Steel Tires—R-5-E
Motor Driven Reel—Resistance Post
Glover—36" Ga., Outside Wheels—A-1
condition.
2 6-Ton Low Vein General Electric Loco-
motives—36-44 Ga. Outside Frame—
CY-21 Motor-Driven Reels—HM-834 500
V. BB Motors. (Will readily convert to
250 V.).
1 Eight-Ton General Electric Locomotive
—36 to 48" Ga.—2" Armor Plate Frame
—250 V. HM-819 BB Motors.
1 6-Ton Westinghouse Locomotive—250 V.
904-C BB Motors, 44" Ga., Outside Steel
Tired Wheels.
1 100 KW General Electric Motor-Gener-
ator Set, 720 RPM, 230 V. Motor, 250 V.
DC Generator.
MOTOR UNITS
2 HM-829 (for 13-Ton General Electric
Locomotive).
2 HM-839 (For Low Vein 8-Ton Locomo-
tive) 40 HP.
1 MH-100 250 V. Motor Unit, 40 HP.
1 MH-149 250 V. Motor Unit, 60 HP.
ARMATURES
12-AA, 12-A (45 Coil), 35-BB, 29-C, 35-L,
35-A, MH-100, MH-88 (500 V.), 904-C,
905, MH-110 High Speed, 61 Coil, 122
Commutator Bar, HM-803, HM-823, HM-
825, 819, 821, 839.
2 Single Drum Hoists with 40 HP 3/60/220-
140 Slip Ring Motors.
1 Jeffrey Loading Boom, 36" x 42" — 14'
Stationary Section—28' Movable Section.
1 Aerial Tram.
1 35-L Low Vein Jeffrey Truck, Rebuilt.
1 24x24 Jeffrey Single Roll Crusher.

R. T. McNEES
Phones 608 and 300
Norton, Virginia (Hotel Norton)

LOCOMOTIVES — CARS

80 ton Whitcomb Diesel Elec. Loco.
65 ton G.E. Diesel Elec. Loco.
2—50 ton New 1942, 0-6-0, S.T. Locos.
60 New 9900 Gal. Cap. Tank Cars.

R. C. STANHOPE
60 E. 42nd St. New York 17, N. Y.

FOR SALE

3—ALL BRONZE — NEW Centrifugal
Pumps, 6" Suction, 5" discharge, 1000
GPM.—280 Ft. Hd. Allis-Chalmers.
Large stock of other sizes, up to 50 HP.

VALVE & SUPPLY CO.

378 Bedford Ave. Brooklyn 11, N. Y.

Strip Miners Attention . . .



GO ANYWHERE • LIFT MORE • REASONABLY PRICED

This multi-purpose unit will prove itself in rough, muddy or mountainous terrain.

Its sturdy construction can be used best as follows:

Mobile unit for prospect drill.

Mechanic's and welder's field-service repair truck with front A-frame.

Air compressor mounting.

Pole setter mounted by A-frame on front, Dirt auger on rear.

Dump-body use for refuse disposal.

Mounting for 5th wheel to pull up to 20-ton trailer.

Base for $\frac{1}{4}$ or .4 cu. yd. dragline.

Made by White Truck Co. for U. S. Army.

White 160 AX Motor (5 ton).

Rubber tracks, can be licensed for use on highways.

With or without 10,000 lb. pull front-mounted winch.

Four-speed transmission with high and low range.

Weight appr. 12,000 lbs.

Replacement Parts— We have a large quantity of all parts, which will be available for years to come. Your inspection of our parts supply is invited.

We guarantee delivery of units in top working condition, and subject to your inspection and trial. Delivery can be made by truck trailer 7 to 10 days from receipt of order. For parts price-list or other information write to

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1989 Manilla St., Memphis, Tenn.

Ph. 2-0728

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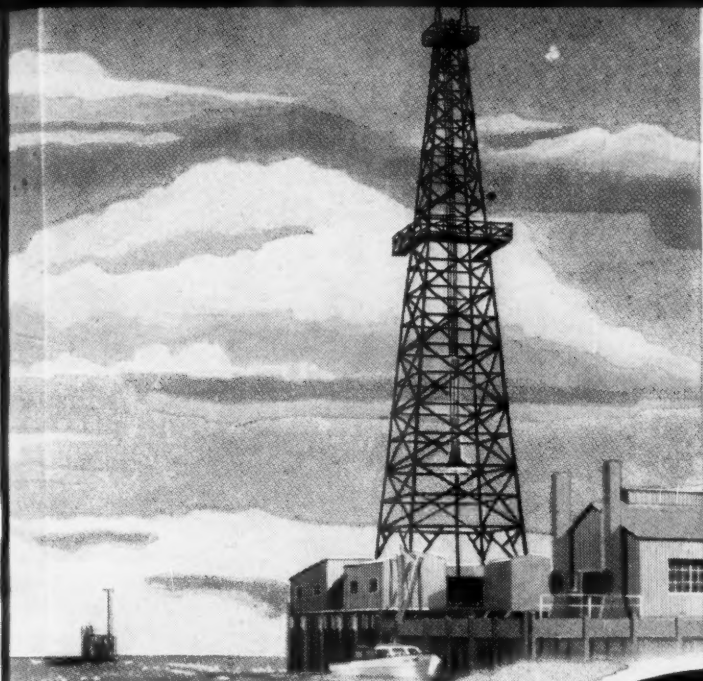
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In Galveston Bay, huge rotary drilling rigs bore nine thousand feet under the sea for oil. Long strings of pipe put tremendous shock loads on wire rope. TRU-LAY Preformed stands up extremely well even under such treatment.



Breaking up hard-packed earth is the first step in grading for water drainage in Nebraska. These earth-breaking machines put constant gruelling strains on the wire rope. Here again, TRU-LAY Preformed gives longer, lower cost service.



Holisting a completely loaded box car onto a Sea-train for over-water journey from Edgewater, N. J., to Texas City. TRU-LAY Preformed is hard at work every day on thousands of huge overhead traveling cranes like these—giving good service.



Far down below ground in West Virginia's soft coal fields, under-cutting machines claw at the walls of coal. Here wire rope is expendable. TRU-LAY Preformed of correct construction adds many extra hours of service—lowers over-all costs.

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

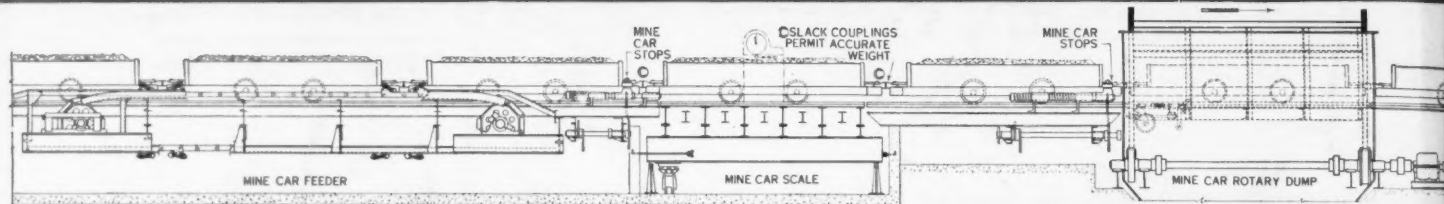
**AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE**

In Business for Your Safety



Tru-Lay
Preformed
Wire Rope

Coordinated Mine Car Handling Solves Weighing and Other Problems...



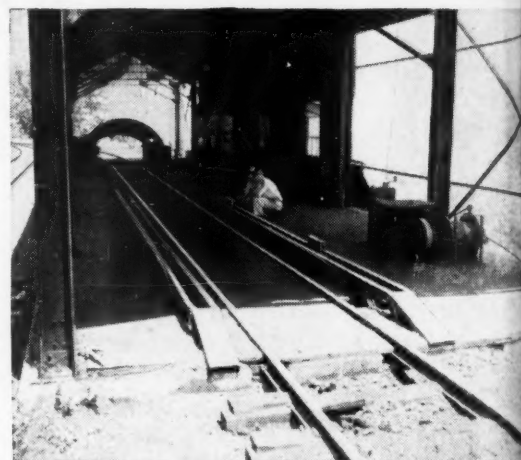
Typical example: Where the miners were paid by the weight of coal in cars, there were complaints of not getting the right weight because of couplings too taut or because bumpers were in contact with the car ahead and behind.

A Link-Belt coordinated mine car handling system provided the answers to this and other problems. Mine cars are now handled entrain at the rate of three per minute, and trips of about 50 loaded cars are fed by a car haul, weighed on an automatic track scale, and dumped in a power operated rotary dump. Only one man is required for the complete operation. The cars are always automatically spaced so that the couplings are always slack — they are not taut and there is no contact between bumpers.

The accompanying sketch and photographs show details of this Link-Belt coordinated mine car handling system. We'll be glad to give you complete data on this and other systems, and coal handling and preparation equipment up to complete plants.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.



Above: Car haul, automatic spacing equipment and rotary car dumper at weigh house.

Link-Belt mine car hauls and car dumper for both mine and railroad cars are made in a variety of types and sizes to meet every capacity and service requirement. They are completely described in Catalog No. 2048-A, send on request.

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered,
Built and Backed by



LINK-BELT